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## NAVAL ARCHITECTS AND MARINE ENGINEERS

The MARINE REVIEW in its issue of Dec. 12 brought the proceedings of the Society of Naval Architects and Marine Engineers to the conclusion of the discussion upon the paper entitled "Test of the S. S. Governor Cobb." Following this Axel Welin read his paper entitled "Appliances for Manipulating Life Boats on Sea-going Vessels." It is impossible to reproduce the illustrations in this article but the text of the paper follows:

### APPLIANCES FOR MANIPULATING LIFE BOATS ON SEA-GOING VESSELS.

The last time I had an opportunity of watching regulation boat drill on a large liner the conditions were the most favorable—broad daylight, no wind, and the ship in harbor. All the various appliances were evidently kept in splendid order, and each boat's crew as fully acquainted with its duty as circumstances permitted. The ship had, however, a faint list—less than 1 degree—but that alone was sufficient to cause quite apparent difficulty in manipulating the boats.

The sensitiveness in this respect of the usual davit is, therefore, one of the greatest of the many drawbacks incidental to the system. Three to 4 degrees list of the ship instantly reduces its boat capacity by one-half. The British board of trade regulations consequently prescribe, in the case of cargo steamers, that the ship shall carry sufficient boats on each side to accommodate the whole crew. That a similar rule does not apply to passenger steamers, where evidently it is so much more called for, is simply the result of the practical impossibility of carrying it into effect.

But the objection which cuts to the very root of the evil is that the system does not and cannot give the crew proper control in handling the boat. The slightest rolling motion of the vessel, when once the guys are loose, is apt to throw the boat into a swinging motion highly dangerous alike to itself and the crew.

Without prosecuting this criticism further, I will now formulate the principal requirements of an ideal system of davits, such as they present themselves to me after several years of keen and careful study.

1. The boat must in all circumstances, and in every position, be under efficient control.
2. A moderate list of the ship must not prevent or appreciably retard the manipulation of the boat.
3. The mechanism should be of the simplest possible nature, with all its "get-at-able."
4. The manner of manipulating the davits must be such as to preclude any necessity for expert training and all possibility of confusion in cases of accident.
5. Cost, weight, and deck space occupied are all matters which must be taken into ac-

count, even if they do not come within the scope of the subject, when treated from a strict "life-saving" point of view.

Reverting to the Welin quadrant davit, I first wish to emphasize one or two purely mechanical points of interest.

#### 1. THE HORIZONTAL TRAVELING MOTION GIVEN TO THE DAVIT ARM.

The advantages of this arrangement in regard to leverage are apparent at first glance. Say that the distance between the keel lines of the boat in the two extreme positions is 10 ft. and the travel of the moving fulcrum 3 ft., the load lever when greatest is 30 per cent less than would be the case with a davit turning on a fixed center, while the working lever (the radius of the quadrant) remains constant throughout the movement (or increases as shown in Fig. 1).

#### 2. THE COMPENSATING ARRANGEMENT OF THE FALLS.

Instead of attaching the falls direct to a belaying pin on the davit proper, they are at first led over the sheaves as seen in Fig. 2, then belayed on the quadrant. The result is that the pull on the falls tends to raise the davits and, though it sounds like a paradox, part of the weight of the boat itself is thus utilized for lifting it inboard. The explanation is easy.

In hoisting the boat from the water it is lifted some distance higher relatively to the upper block than would be necessary if the falls were to be belayed direct on the belaying pin without first being run over the said sheaves, and then, as the davits are swung inboard, the boat drops back. The distance of this drop, multiplied by the weight of the boat, represents the assistance obtained in manipulating the handles, *e. g.*, if the weight of the boat is 30 cwt. and the drop 18 ins., the gain would be  $2\frac{1}{4}$  ft.-tons, not deducting anything for additional friction and stiffness of ropes.

I do not wish to weary you with further details of the gear itself, but proceed to describe some typical installations of it.

Generally speaking the boats are placed at a distance from each other of about 5 ft., which is sufficient for the working of two single davits between the boats. A more compact and perhaps neater looking installation is that formed by double or twin davits between the boats (*b.* Fig. 3). Some firms, however, object to the use of twin frames on the ground that only half the number of boats in each row can be swung out simultaneously. The objection admittedly only holds good in regard to boat drill, when, of course, it is more imposing to see all the boats going out precisely at the same moment. In actual use the lowering of all the boats simultaneously into the water would, even under favorable circumstances, invite confusion and disaster.

When the fitting of single frames is insisted upon, but the length of available deck does not admit of the boats being placed 5 ft. apart, a distance piece is dropped over the handles to prevent these from fouling each other or a special bevel gearing is fitted.

Occasional difficulties have arisen where an excessive outreach has been required. In simple cases where this has merely been

caused by the adoption of a particularly wide belting or rubbing strake, it has been surmounted by shifting the center pin of the quadrant relatively farther towards the back of same, and this, coupled with the throwing out of the outboard end of the frame a few inches, has, so far, proved equal to all demands (Figs. 4 and 5).

In the cases of battleships, however, where the boats are so frequently carried on lofty superstructures situated at some distance inboard, the problem has presented more features of interest, especially when the heavy weights of boats, usually carried in vessels of this class, be considered.

Increasing the length of the arm is not a practice which can be continued indefinitely, as apart altogether from the resulting strains and stresses of the metal itself, there is a limit where the excessive labor consequent upon an increased leverage is such that a quadrant davit would offer little or no advantage over the present battleship arrangement for slinging out boats by means of derricks or similar appliances. The plan adopted to gain the end required, while retaining to the full the advantageous arrangement of the quadrant, has been arrived at by what may be termed differential radii (Fig. 1) being given to the quadrant, with the result that while the boat may be slung out with perfect ease, there is no especial difficulty attaching to bringing he same home again, the greatest lever being available when most needed.

Whatever criticism you pass on the Welin quadrant davit as a mechanical contrivance, I am bound to say that its adaptability to all kinds of arrangements of the boats has fairly astonished me. Here are a few examples:

Fig. 6 shows a boat chocked half outboard, thereby saving for promenading purposes some 120 sq. ft. of deck space in the case of each individual boat. These are as safe as when stowed inboard and need only be swung in when the ship enters harbor. To do so requires a fraction of a minute.

The fact that the davit arm always remains in a locked position unless manipulated by means of the screw is one of the more important points about this system. I have included a scale diagram of a ship in section (Fig. 7) having a list of 8 degrees, wherein you may notice the boats in different positions. In connection herewith I can do no better than quoting a few lines out of a testimonial from the North German Lloyd based upon prolonged trials:

"With a list of 11 degrees of the ship the boat on the high side was put out in 45 seconds. When the ship was rolling to a fair degree this was again done in one minute by four men, and the superiority of these davits, in so far that they remain stationary at any point without guying, then became apparent."

A row of boats placed abreast on the top of a deck house may be run out one after the other to the edge of the deck on either side, picked up and swung outboard by the davits. No other gear that I know of lends itself so admirably to a plan of this kind. Fig. 8 shows a modification of the davit itself, by

which, if the use of a rail arrangement such as shown in Fig. 9 is undesirable, a boat standing inboard of another may be picked up direct from its chocks and swung outboard.

Before concluding, I must take up a remark which has been put to me on more than one occasion—"What is the good of taking so much trouble over a question like this? The chances of ever getting any lifeboat safely into the sea from the tremendous height at which they are placed on present day liners are so remote that it is useless to hope for success, whatever davits are adopted."

That is hardly sound reasoning, but it contains a great deal of truth, all the same. Sooner or later some different plan of placing the boats must and will be adopted; it is only a question of time.

Some eight months ago, I put a suggestion on the lines illustrated in Fig. 10 before a prominent firm of ship builders on the continent, without, however, at the time obtaining any definite result. I am, of course, fully alive to the many difficulties in the way of getting some such scheme adopted, and it may require a few more of those disasters which stir humanity to its very core, before conservatism can be made to budge.

Ship builders do not, as a rule, welcome deviations from orthodox designs; that such deviations, possibly resembling the one fore-shadowed above, must ultimately come, I am nevertheless more than ever confident. At a time when scarcely a month passes without witnessing the birth of some new leviathan, each exceeding its forerunner in speed and passenger-bearing capacity, the compelling necessity for such vessels to be fully equipped with life-saving appliances of the highest order is a fact which cannot fail to thrust itself with an added force and conviction upon the observation of the most callous.

In bringing these remarks to a close, and speaking, as far as it is possible for me, from an impartial standpoint, I venture to assert that if ever there was a moment when the matter so briefly dealt with in this paper called for careful and renewed consideration, that moment is now, when the gigantic creations of recent months and the rumors of even greater things in the near future, bring to the whole subject a new significance.

#### COMMUNICATED DISCUSSION.

H. C. Higgins, superintending engineer, Old Dominion Steamship Co.: I have your favor of the 14th inst., inviting me to discuss a paper to be read by A. B. Welin on boat davits. While there are two sets of Welin boat davits on the ships of the Old Dominion Steamship Co., we have never had occasion to use them at sea, or in port in fact, except at boat drill. We, therefore, have had little practical experience with them, and although I firmly feel they are a very good article, there is nothing I could say that would be of interest to the society. I thank you for your invitation.

Lewis Nixon: I feel that all the members of the society are grateful to the author of this paper for bringing to their attention a development looking to the saving of life at sea. It has been said, as we all know, a great many times, there has been but little improvement in the method of handling the boats on shipboard since the day of the ark. Probably Noah used the same appliances as we have at the present day. That does not argue, necessarily, that they are so very bad, but does show that not much attention has been paid to improving them. Of course, you have a prejudice on the part of the builder who has to make his estimates as low as possible, and owners are not in favor of adding

developments that directly increase the cost of their ships, but I believe if the superiority of this method of handling boats impressed itself on the ship owning class, that they will be specified by them, and naturally it will turn the attention of owners of pleasure boats to them, will bring their advantages prominently before such owners, with the consequent result that either they will be adopted, or there will be improvements made along the lines of handling life boats, so that we may finally secure the advantage of these improvements, and the advantage of any development which leads to decided improvement in any part of the equipment of the vessel is, of course, well understood by the naval architects of the world, and for that reason I think we are indebted to Mr. Welin for this very interesting paper.

Mr. Hyslop: I am glad to have heard Mr. Nixon express himself as he has. I have no doubt that the reason, one important reason, why this matter of improvement has received so little attention from ship owners, has been largely due to the fact that in the contrivances brought forward within the past 50 years, and until quite recently, until perhaps nine years ago, or thereabouts, the greater number of these were absolutely foolish. About that time, I employed a patent agent to procure for me a copy of every patent referring to launching boats, and I looked carefully through these papers, and I think the number that I got was about 35; most of them had reference to davits, and out of the whole number there were only about two that really, I thought, would be entitled to any consideration by an intelligent ship owner or builder.

But, whilst the form of davit is perhaps the most important thing to consider, there is nothing in the various processes for launching such boats on an occasion of that sort that is not material and there is not one consideration which is to be neglected. Now, of course, these processes are numerous, there are the gripes to attend to, there is the removal of the covers from the boats, there is very ordinarily the necessity to raise the boats out of the chocks before they can be moved on board the boat, and then there is that most important thing, a matter I think where the chief difficulty and chief weakness in the ordinary means of using a life boat is to be found, there is that matter of getting the boat from the inboard side of the davit to the outboard, and in proper posi-

tion for lowering away. Now, whatever these difficulties are in connection with these various processes, there will remain some difficulty connected with the rolling of the vessel, or in connection with any list she may have, and the importance of having proper provisions and proper consideration given to these preliminary processes lies in the freedom which it gives to the concentration of attention to the one process of lowering the boat away and the freedom from embarrassment in dealing with those difficulties that always have and probably always will occur.

I heard some years ago of improvements which had been made in various little details in a ship over in Hoboken, and securing the proper entry, I saw the captain of the vessel and he put me in charge of the second officer to show me anything that I wanted, and I found two things which are rarely referred to, but which really are important, which had been covered in the provisions of that ship. There was just below the gunwale of the boat and outside of it a bolster continuous from one end to the other, semi-circular bolster, canvas covered, filled, I presume, with cork. Now, in an iron boat or any boat, that bolster is very useful. It saves the life boat from being stove in after she has been launched, or in the process of launching. I have seen an occasion where a life boat has been stove in in that way. This bolster has another use and permits of the cover of the boat rolling down, just below the projection of the bolster, and in the case of a boat pointed on both ends a lacing rope through the outside edges of that cover with a simple toggle on each end, secures it in place and it can be cast off in a moment. In a similar way, I notice in the illustrations which accompany this paper, that the form of chuck renders unnecessary the hoisting of the boat before it can be moved out outboard. That is to say, chucks are inboard. The boat is held against the chucks inboard securely, the gripes hold it down to it, and the boat is not permitted to slide outboard, because a simple rod, operating from the inner side of the boat, inboard side of the boat, is turned up in its place.

In the plan put before you at the present time, all the complication of letting go one means of securing the davit in position is avoided. You have one simple movement outboard, and that movement is controlled by a power much stronger than that to be obtained by direct push by a number of men.

Roland Allwork: I think there is one important thing brought out in this design, and that is the method of lowering down the boats. These davits simply take the boat over the side, and the boat has to be lowered by the ordinary fall. If we had a winch, or something to lower them down in the same way, I think we should be better off. I believe these are the best davits on the market now, but I think it lacks that one thing.

Frank E. Kirby: While this general type of davit has been before us in one way and another for a good many years, in fact on western river boats it is the universal type, but the complexity of it for use on seagoing steamers has prevented its general adoption. As usually adopted, it required two sets of falls, one to get the davits in and out and one to handle the boat. Mr. Welin has provided positive means of handling the davits, insuring stability and certainty of operation. The suggestion he makes of stowing the boats near the water in large seagoing ships must commend itself to any one who has witnessed the operation of getting boats out ready to be launched when located in a high position on the deck of a ship. I might supplement the remarks of the last speaker, saying that I consider it very desirable that some means should be provided for simultaneously lowering and hoisting both ends of the boat. It should be controlled from some central location.

F. L. DuBosque: In connection with this method of controlling the davit, I notice in the photograph here, on page 6, that the hand crank which operates the screw is turned with the handle outward, so as, I suppose, to economize space. When it is to be applied, this crank must be taken off and reversed. You know how difficult it is to put a crank in its place and keep it there, and I should anticipate in a rough sea, that a man, endeavoring to refit this crank on the controlling screw, would have some difficulty, and that either he or the crank would fall overboard, and it seems to me there is an opportunity for very great improvement in the application of the screw.

R. R. Row: The only point of information I would like is this—will the davits let themselves out and be controlled by the weight of the boat? If something should happen to the crank, so that the boat should slip outboard, would the weight of the boat in connection with the leverage,

have a tendency to bind the screw; has it special screws, a special V thread? Perhaps Mr. Welin can inform us about that.

Mr. Welin: The pitch angle of the thread is just a little below the angle of repose, so that the boat cannot be launched, and the davit cannot run out, unless the screw is actuated upon the handle and revolves.

R. R. Row: The operation must come from the handle?

Mr. Welin: Yes.

Henry L. Des Anges: May I ask the writer in case the cranks were lost or misplaced or thrown overboard, how would you launch your life boat?

Mr. Welin: The handle must not be lost. The British Board of Trade stipulates that the handles shall be fitted so that they may be reversed, but not taken away. They are either screwed to the screw itself, or they are attached to a sufficiently strong chain so that they cannot be carried away. You can take the handle off and reverse it, but you cannot carry it away. Should a chain break and a handle be lost, there are handles supplied to the frame, of course. The chain follows the movement of the screw. The chain is fitted to the screw itself and revolves with the handle.

Mr. Des Anges: Is it swiveled on the crank?

Mr. Welin: It is clamped on the shank of the screw, the screw and chain and handle are all revolved together. As to the question of lowering the boats, it can be done by band brakes or winches or that sort of thing. The plan has been to keep the whole mechanism as simple as possible. There are one or two designs already gotten out, and any one insisting upon the winch arrangement fitted to each davit, or each pair of davits, can have it, but I do not think any one need trouble about it. It is not difficult, if the delaying pins are properly made, to lower the boat. We have been informed that there is at least one and a half sailorman in each boat, and one man at one end and a half a man at the other end, would be able to launch a boat safely.

#### TRANSPORTATION OF REFRIGERATED MEAT TO PANAMA.

The next paper read was entitled "The Transportation of Refrigerated Meat to Panama" by Roland Allwork. This paper will be published in full in the REVIEW later.

#### DISCUSSION.

Lewis Nixon: It is a great pleasure to rise to say that we have at least

one model paper, where the author has given us all that we could possibly expect, and has presented the paper in a business-like and practical way, and in the way in which it is presented it is of tremendous importance and use to all of us. We are building ships and designing ships for useful purposes, carrying the products and commodities of the world across the ocean, and every step in advance in the means of conveying these products is of tremendous importance to us; but when the information is given to us in the clear, straightforward way in which it has been presented to us in this paper—dimensions, size and character of materials and results of the work—it presents itself in the form of a type we welcome and desire to have in our proceedings; I rise simply to say that I feel that we owe a strong vote of thanks to the author of the paper, not only for the value of the paper, but the way in which it has been presented and the fact that it is not open to the objection that it is lacking in data. We want papers of this type, not only as to the best methods of handling of coal, handling of grain, but also the carrying of live stock, horses and cattle across the ocean, and I hope the splendid paper which has been presented here will be an incentive to others who are carrying these various commodities upon the sea to give us as good papers upon these other forms of carrying commodities at sea as this one has given us. I consider the paper a model in every respect.

R. R. Row: In connection with Mr. Nixon's remarks, I want to say, in behalf of our member. Llewellyn Williams, who is the superintendent of refrigeration of the United Fruit Co.—he and I being closely associated in connection with some work—I want to say that I feel sure he tenders his regrets at not being here. He is at present building four vessels for the United Fruit Co., at Belfast, Ireland, and in this connection with Mr. Nixon's remarks, I heartily agree with him in extending a vote of thanks to the author of the paper, Mr. Allwork, on account of the very valuable details which are embraced in the paper and for the excellent manner in which it has been presented. We are all looking for details, and I feel sure if Mr. Williams were here he would be glad to impart some knowledge which might interest us all.

I remember when I was associated with the James Reilly Repair & Supply Co., we installed for the United Fruit Co. two refrigerating plants,

one in the Prince August Wilhelm and the other in the Prince Joachim, and it was done under the personal supervision of Mr. Williams in connection with the United Fruit Co., as these ships were chartered by that company for a term of years from their passage from Jamaica back to New York, but on the way down to Jamaica they were really controlled by the Hamburg-American Line, and in connection with that I know—not being a refrigerating engineer, but a member of this society—from Mr. Allwork's paper and the details outlined by him that they are of the greatest importance to engineers engaged in this class of work, showing, as they do, the modern improvements which have been made in this line of work; and I am going to try to get Mr. Williams to give us a detailed account of the performance of these vessels, which he will no doubt be glad to do, and also in connection with the four ships he is now building.

Lewis Nixon: That is exactly what I wanted to bring out. This author has given as the benefit of his experience as he learned it, giving it fully and well, and in such a way that we can appreciate and understand it. If there have been any improvements made, over the details given by Mr. Allwork, then those who wish to criticize the paper should give us as full a statement of these improvements, as he has done, and therefore I feel that we have one paper of very great value.

The President: The chair agrees with you, Mr. Nixon.

Mr. Row: I made an error in stating there were four ships being built; there seems to be but three.

The President: I hope the fourth will be built in the United States.

E. P. Bates: I would like to ask the gentleman a question. I read the paper before coming here, and I have heard what I could of its discussion in spite of the noise in the rear of the room, and also paid attention to the reading of the paper while Mr. Allwork was reading it, and I got the idea that his coolers were constructed with two walls, an outer wall and an inner wall, with cork between, making one air space, is that correct?

Mr. Allwork: There are two pipes, one pipe inside, and the ammonia is in the outside pipe. The whole thing is insulated with cork, but the ammonia is in the outside pipe and the brine is in the inside pipe.

Mr. Bates: How many air spaces outside of that.

Mr. Allwork: There is no air space—you mean the cooler?

Mr. Bates: Between the coolers and the outer air, any air space, except where the pipes run?

Mr. Allwork. No, it is all insulated, it is a pipe within a pipe. It is shown on this drawing.

Mr. Bates: In building coolers ashore where we have plenty of room and material, we frequently build with five air spaces, without any pipe in the air space, the pipe being in a large room where the produce is stored.

Mr. Allwork: You are talking about the room, not the coolers?

Mr. Bates: The room, not the pipes.

Mr. Allwork: You are talking about the insulation of the room itself?

Mr. Bates: Yes.

Mr. Allwork: Certainly there is an air space all around.

Mr. Bates: One air space?

Mr. Allwork: Only one air space.

Mr. Bates: And that is sufficient?

Mr. Allwork: Yes.

Mr. Bates: One air space filled with cork?

Mr. Allwork: No sir, one air space filled with air.

Mr. Bates: I thought the room was filled with cork.

R. R. Row: Speaking of air space in insulation, I want to say that I remember that in discussing a few matters of detail on refrigeration with Mr. Williams, he claims that cow hair was the best insulating material to prevent deterioration of metals. In other words, the sides of these ships were packed with about eight inches of cows' hair, and I remember it very distinctly, because the question came up of what was the weight of cow hair per cubic foot, and we had no specific way of deciding what it did weigh, until we bundled it up and weighed it, and for the information of my fellow members I will say that we took the average weight as 13 lbs. per cubic foot, and fortunately when we made our calculations, before we received the work as the lowest bidders, we placed a much higher figure, cow hair was most extensively used at that time, and the Hamburg-American line was kind enough to get for us. The use of cow hair has proven that it prevents a sweating which would deteriorate any metal. Of course, it is more expensive than cork, and in these ships the cow hair was used to prevent corrosion of metal against the sides of the ship, the skin of the ship.

Mr. Allwork: I do not think I have anything to say, further, except

that I was wrong in replying to Mr. Bates. There is an air space in the cork insulation, but as he says, it is filled with granulated cork, but in the spruce insulation there is one inch air space, from which you will see that there are two different forms of insulation. I think that is all I have to say.

Adjournment was then taken until Friday afternoon.

#### SHIP YARD WORK IN SAN FRANCISCO.

San Francisco, Nov. 21.—In spite of the boasted facilities in and near San Francisco, which were considered equal to all demands, it is found now that this city and coast are sadly lacking in ship yards and dry docks. There is so much work to be done at present that necessary repairs are delayed and ships must wait. San Francisco has neither sufficient ship yards nor dry docks, nor mechanics to handle the work on hand, and the big fleet which is expected has not come. Mechanics and laborers are needed more than anything else to meet the growing demand for work on big ships. These are busy times at the Mare Island and private ship yards, and much of the work has to be sent north and south, for lack of facilities here.

The gunboat Yorktown, which has been under repairs at the Mare Island navy yard for several weeks, will leave today for Hunter's Point in this city where she will be docked, afterwards returning to Mare Island, where she will take on stores and provisions before joining the fleet. Her docking at Hunter's Point was made necessary because the Mare Island dock is occupied by the army transport Sheridan, on which work for 100 days is in progress. The Sheridan will be released from the dock about Jan. 1, and the Milwaukee is expected to take her berth.

The Yorktown, it was understood, was to return to Central America and resume her duty of protecting American interests in that country, but the order may be changed and she will engage in target practice and then go to Santa Barbara.

The cruisers Maryland and West Virginia of the Big Four, which were to come to the Mare Island navy yard early this month, remained at San Diego harbor until the unveiling of the monument to the Bennington's dead, which took place yesterday, and the cruisers will reach here early in December. The ships are under orders to have considerable work done by the construction and repair department, while the steam engineering department estimates that the overhauling of the machinery alone will exceed the other work, and the ships will have to remain at the navy yard for several weeks.



## CANADIAN GRAIN SHIPMENTS.

Port Arthur, Dec. 13.—The season of navigation just closed has been on the whole satisfactory to Canadian vessel owners. Grain rates to Georgian Bay ports, Buffalo, Kingston and Montreal, were well maintained throughout the spring and summer. A late harvest, and a more or less short crop in the Canadian northwest, together with the general financial stringency prevailing everywhere, ac-

stone over their furnace dock. This company also shipped about 6,000 tons of pig iron to eastern lake points.

The following vessels are wintering at these ports: Paliki, Meaford, John J. Boland, James B. Wood, H. J. McIntosh, Charles O. Jenkins, and Abraham Stearns. The three former will load storage cargoes. The Charles O. Jenkins loaded and was ready to clear for Buffalo on Dec. 8 but could not obtain satisfactory insurance facilities

The sale of the steamer Saginaw and the barge Pomeroy by the United States marshal of Port Huron has been delayed until Jan. 15, owing to the present financial stringency.

Captains C. H. Woodford, J. A. Holmes and Samuel Allen were appointed a committee at a meeting of the Cleveland lodge of the Ship Masters' Association last week to secure new headquarters for the association.

F. W. Raether, lightkeeper at Waukegan, is believed to have slipped from the icy pier into the lake and drowned last week. His cap was found floating about in the lake by an assistant who came to relieve him.

At the annual meeting of the Association of Passenger Steamboat Lines in Washington last week, the following officers were re-elected: President, George A. White; secretary and treasurer, W. E. Herman; executive committee, T. F. Newman, J. C. Evans, C. J. Smith, C. M. Englis, F. C. Reynolds, B. W. Parker, H. W. Thorp.

Considerable repair work will be done at the Superior ship yard during the winter, and its working force is being constantly increased. The steamer Socapa which grounded on a shoal just off the Buffalo breakwater two or three weeks ago, and which is in very bad shape, will be repaired at this yard. Five or six other steamers are laid up at Superior, waiting for minor repairs, among them being the Hoover and Mason, Hoyt, Clemson, Olympia and Wells. This repair work in addition to the new steamers which are scheduled to be built at the yard, will probably increase the working force of the plant materially. The company within the last week has added about 200 men to its pay roll.

Major Graham D. Fitch in a report submitted to congress through the war department last week, recommended that a harbor of refuge be constructed at the eastern entrance to the Keweenaw ship canal, Lake Superior. The last river and harbor act authorized a preliminary examination of the canal with this end in view. The plan presented by Major Fitch contemplates the excavation of a basin with a mooring pier just within the eastern entrance to the canal, and involves the acquisition of a considerable tract of land in addition to that pertaining to the present canal property. It will cost \$210,000 to construct this harbor of refuge. Lieut. Col. W. H. Bixby, division engineer, and the board of engineers favor Major Fitch's plans.

Following is a statement showing shipments of grain by vessel from Port Arthur and Fort William for the crop season of 1907, Sept. 1, 1907, to the close of navigation, Dec. 1, 1907, inclusive:

	—Wheat—		Oats		—Barley—		Flax	
	Canadian	Foreign	Canadian	Foreign	Canadian	Foreign	Canadian	Foreign
Owen Sound .....	1,133,169.20		1,063,196.02		178,745.44			
Midland .....	2,208,128.50		34,493.24		24,139.02			
Tiffin .....	376,657.10		154,562.02		77,240.22			
Depot Harbor .....	2,353,062.10		70,337.32					
Collingwood .....	159,772.10		13,415.20					
Point Edward .....	1,064,299.50		55,705.18		31,100.28		15,000.00	
Meaford .....	687,879.10		176,884.30		41,637.28		128,699.27	
Goderich .....	1,833,674.10		126,153.32					
Welland Canal .....	429,695.00						31,701.44	
Kingston, Prescott and Montreal .....	4,929,673.30		339,536.20		116,419.20		142,092.26	
Port Huron .....	301,093.50	101,395.50	6,344.02					
Buffalo .....	929,164.50	3,080,670.20			51,470.20	40,273.44		
Erie .....	300,181.00	219,392.20						
Chicago .....		85,554.20						
Canadian vessels .....	16,606,351.00	3,487,012.50	2,040,620.12	538,249.40	40,273.44	317,493.41		
Foreign vessels .....	3,487,012.50			40,273.44		317,493.41		
1907 .....	20,093,363.50		2,040,620.12	578,523.36		317,493.41		
1906 .....	25,160,266.10		2,238,769.16	379,548.08		207,226.34		
Decrease .....	5,066,902.20		198,149.04	*198,975.28		*109,267.07		

\*Increase.

Grain shipped from Port Arthur by vessel, Sept. 1, 1907, to Dec. 8, 1907 (close of navigation):

	—Canadian Northern Elevators—			—King Co.'s Elevators—			Total Shipments
	1907.	1906.	Increase.	1907.	1906.	Decrease.	
Wheat .....	8,182,517.40	5,475,128.00	2,707,389.40	559,527.00	1,046,539.30	487,012.30	8,742,144.40
Oats .....	379,204.04	333,470.08	45,823.30	43,949.10	107,916.30	63,967.20	423,243.14
Barley .....	321,839.14	166,219.10	155,620.04	41,462.02	46,943.36	5,481.34	363,301.16
Flax .....	9,130.10	28,979.44	19,849.34	206,473.05	130,079.28	76,393.33	215,603.15

Total shipments of wheat from Port Arthur and Fort William, 20,093,363.50 bu. Of this quantity 8,182,517.40 bu. were shipped from the Canadian Northern elevator, a record for any one elevator in the history of the two towns.

In Store.—At the C. N. R. elevators there is still in store in the neighborhood of 2,000,000 bu.

counts for the low grain rates that obtained during October, November, and up to Dec. 8 when the last boat loaded.

The quantity of grain of all kinds, shipped out of Port Arthur and Fort William for the season of 1907, fell about 5,000,000 bu. short of the shipments for 1906. This shortage was made up for in a measure in the general increase in the volume of west-bound package freight, coal and steel rails.

The Canadian Pacific railway handled 8,000,000 tons of coal over their Fort William docks, and the Pittsburg Coal Co. handled 7,000,000 tons over their Port Arthur docks. The Atikokan Iron Co. handled 75,000 tons over their Port Arthur docks, and the Canadian Northern railway received some 50,000 tons over their Westfort dock. The Atikokan Iron Co. also received 30,000 tons of lime-

and consequently was forced to go into winter quarters.

Incorporated herewith is a statement of the quantities, kinds, and destinations of all grain shipments out of Port Arthur and Fort William for the season of 1907.

## AROUND THE GREAT LAKES.

The Dunham Towing & Wrecking Co., has been awarded the contract for the winter crib work at Chicago.

The steamer Douglas was bought at an auction sale at Detroit last Thursday by Capt. Harris W. Baker on his bid of \$650.

The tug T. C. Lutz lost her rudder while going into Sandusky harbor last Saturday. The channel marks have been removed at that port.

During the season of navigation just closed 921 vessels arrived at Fort William and 968 departed. Coal receipts of the port were 900,000 tons.



DEVOTED TO EVERYTHING AND EVERY  
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### NEW OCEAN MAIL BILL.

Senator Gallinger introduced the fol-  
lowing bill in the United States senate  
on Dec. 4, which was read twice and re-  
ferred to the committee on commerce:

To amend the Act of March 3, 1891, entitled  
"An Act to provide for ocean mail service  
between the United States and foreign ports  
and to promote commerce."

Be it enacted by the Senate and House of  
Representatives of the United States of Amer-  
ica in Congress assembled That the Post-  
master General is hereby authorized to pay  
for ocean mail service under the Act of  
March 3, 1891, in vessels of the second class  
on routes across the Pacific Ocean or to ports  
of the South Atlantic four thousand miles or  
more in length, outward voyage, at a rate per  
mile not exceeding the rate applicable to ves-  
sels of the first class as provided in said Act.

This bill, in its practical effect, pro-  
vides for twice as many new contract  
mail lines and twice as many ships as  
were provided for in the ocean mail  
bill as passed by the national house last  
March and defeated by a filibuster in  
the senate.

That bill, in the form in which the  
house sent it to the senate, provided for  
four lines to South America. This new  
bill applies to South America, and also  
to the Orient and Australasia across the  
Pacific ocean, which the house struck  
out of the bill of last March just be-  
fore its passage.

The lines, which in natural probability  
would be established under the new bill,  
are as follows:

No. of lines.		No. of steamers.
1	Atlantic coast to Brazil.....	5
1	Atlantic coast to Argentina.....	6
1	Gulf coast to Brazil.....	5
1	Pacific coast to Orient.....	6
1	Pacific coast to Orient.....	6
1	Pacific coast to Australasia.....	6
6		34

The Pacific coast desires and expects  
its own communications with South  
America. This could be made possible  
by a slight verbal change in the new  
bill substituting the words "South Amer-  
ica" for "South Atlantic." Such a line,  
to Peru and Chile, would require as  
many steamers as the line to Argentina,  
or six in all, making a total ocean mail  
fleet of 40 steamers.

There are now running on these routes  
no ships at all to South America, and to  
the Orient only five steamers of the Pa-  
cific Mail Co. (one of them old, small,  
and probably about to be discarded), and  
one steamer of the Hill line—the two  
large steamers of the Boston Steamship  
Co. are of only 14 knots maximum speed.

The Oceanic line from San Francisco  
to Australasia was given up last spring.  
This company has just stated that if the  
new bill passes, it will use its present  
three steamers to start the service, but  
will sell them just as soon as new ships  
can be completed.

Thus, the seven lines which would in  
all probability be established under the  
new bill would require the construction  
of 35 new steamships, for a full fort-  
nightly service on each route, with one  
ship in reserve.

The routes to South America would  
call eventually for 22 new steamers of at  
least 6,000 gross tons—the smallest size  
which could be profitably operated on  
such long voyages. The three lines  
across the Pacific, outside of the Pacific  
Mail liners Korea, Siberia, Manchuria  
and Mongolia, and the Hill liner Minne-  
sota, now being operated, would call for  
the construction of 15 new steamers, pre-

sumably of upwards of 8,000 tons. The  
Oceanic company has plans ready for 8,-  
000-ton steamers for Australasia.

The amount of mail compensation  
would be in round numbers as follows:

Atlantic coast to Brazil.....	\$ 600,000
Atlantic coast to Argentina.....	700,000
Gulf coast to Brazil.....	600,000
Pacific coast to Orient.....	700,000
Pacific coast to Orient.....	700,000
Pacific coast to Australasia.....	700,000

Total six lines.....\$4,000,000

A seventh line from our Pacific ports  
to South America would call for \$700,-  
000 more, or in all \$4,700,000 for a full,  
fortnightly service. The total amount  
carried for ocean mail lines in the bill  
last March was \$2,600,000, and in the  
original Merchant Marine Commission  
bill, \$2,700,000. The present net profit  
made by the United States from its ocean  
mails is \$3,600,000 per year, and this is  
increasing every year by about one-half  
a million dollars.

The government now spends on Amer-  
ican ocean mail lines under the law of 1891  
about \$1,400,000 per year—this including  
the compensation of the American line  
to Europe, about \$700,000; of the Ward  
line to Cuba and Mexico, \$200,000; of  
the "Red D" line to Venezuela, \$100,000;  
of the "Admiral" line to Jamaica, \$120,-  
000; and of the Oceanic to Tahiti,  
\$42,000.

### NATIONAL GEOGRAPHIC SOCIETY.

The annual banquet of the Nation-  
al Geographic Society was held at the  
New Willard Hotel, Washington, on  
Saturday last and was presided over  
by Prof. Willis L. Moore, president.  
The gathering was most distinguished,  
including Dr. Alexander Graham Bell,  
Major General A. W. Greely, Mr.  
James Bryce, the British ambassador;  
J. Jusseraud, the French ambassador;  
Baron Moncheur, the Belgian minister;  
Baron Mayor des Planzes, the Italian  
ambassador; Mr. Brunn, the Danish  
minister; Bishop Satterlee and many  
senators and representatives.

The society conferred upon Capt.  
Roald Amundsen a gold medal in re-  
cognition of his work in the far north.  
Among the speakers were ambassador  
Bryce, Representative Theodore Bur-  
ton, Representative J. Hampton Moore  
and Mr. Harvey D. Goulder. Mr.  
Goulder's subject was "The Five in-  
land Seas." Attention will be given to  
Mr. Goulder's speech in the next issue  
of the REVIEW.

### DODD-ROGERS NAUTICAL SCHOOL.

The Dodd-Rogers Company, 1926-1930 East 6th St., Cleveland, who have added a department of nautical instruments to their extensive business, have decided to open nautical schools not alone in Cleveland, but in Conneaut, Port Huron and Marine City during the winter months. These schools will be under the direction of E. H. and A. D'A. McNevin, who are well known along the chain of lakes as teachers of navigation and compass adjusters. The Cleveland nautical school will be conducted in quarters above the Bond street store of the company. These quarters are not quite ready for inspection as yet, but will be within a few days.

The company is to be commended for its progressiveness in establishing these nautical schools. During the past two or three years great interest has been taken by men employed aboard ship in the science of navigation, especially so among the younger element. The movement has had the enthusiastic endorsement of vessel owners who are doing all that they can to urge their men to become proficient. The evolution on the great lakes has in fact come so swiftly as to take many unawares. The average carrying capacity of the lake freighter has practically doubled within the past three or four years with a corresponding increase in value, and it is not infrequent nowadays for a ship and her cargo to represent a monetary value of \$1,000,000. Vessel owners and marine underwriters are naturally anxious that so valuable an investment as this should be safeguarded in every way and it is for this reason that schools of navigation have received not only cordial endorsement but the actual assistance from them within the past three or four years.

As soon as the Dodd-Rogers school is organized the MARINE REVIEW will devote an illustrated article to it.

### PIG IRON SITUATION.

A holiday period of greatly restricted production and decreased demand is ruling in the iron and steel market. The announcement of the revised and long expected specifications on Bessemer steel rails adopted by the manufacturers of the United States and Canada and practically subscribed to by the rail users, is expected to stimulate business in this line. A sliding scale of prices is based on \$28 at the mill for 9 per cent discard from the ingot with 29 cents per gross ton advance for each additional

1 per cent discard. Some increase in inquiry for pig iron is reported in some districts, and there are current rumors of exceedingly low quotations which cannot be confirmed. In finished lines the leading interests are operating less than one-half their capacity. The coke production is about 40 per cent of the normal output and prices are weakening.

### ANSWERS TO QUESTIONS FOR WHEELSMEN AND WATCHMEN.

273. A book describing light-houses, fog signals, location, bearings of same, buoys, channels, etc. It is furnished by the government free of cost.

274. Two. The blue covered one is a description of all the lighted aids to navigation, and the brown covered book is a description of buoys and day marks.

275. Contain all the information connected with the aids of navigation.

276. Make application to the Light-house Board, Department of Commerce and Labor, Washington, D. C., or to the various inspection boards on the lakes, or any customs office. They are for all licensed officers and candidates for licenses.

277. They are for the information of mariners and notify them of all changes and new aids to navigation, besides other valuable information. They are published weekly.

278. Have your name sent to any one of the branch hydrographic offices.

279. For the correction of the yearly books on aids to navigation.

280. North.

281. South.

282. The right side east and the left side west.

283. To show the vessel's track, the lay of the land, the locations of shoals and other danger points, soundings, harbors, lighthouses, etc., etc.

284. Hold my course. Schooner on starboard bow is on starboard tack running away from me and the vessel on the port bow is on the port tack running away from me.

### QUESTIONS FOR MASTERS AND MATES.—NO. 52.

689. What is heeling error?

690. On which points of the compass is the heeling error the greatest and on which points is it the least?

691. What is the cause of heeling error?

692. What is the rule for heeling

error on the lakes, that is, which way does a port and starboard list effect the compass?

693. How would you find the heeling error?

694. What is the meaning of heeling co-efficient?

695. What is the dipping needle for?

696. Can a perfect and reliable heeling error adjustment be made by means of the dipping needle?

697. What effect will a steel hull have on a dipping needle after it is suffered to remain on board for any length of time?

698. What is the most reliable way of adjusting the heeling error?

699. The Dev. with ship's head north is 0; when heeling 10° to starboard, Dev. is 14° Wly. What is the heeling deviation for each degree of heel?

700. The heeling deviation on north for each degree of heel to starboard is 1.5° Wly. What would the heeling error on NNE be for 12° of starboard heel.

### QUESTIONS FOR WHEELSMEN AND WATCHMEN.

307. Draw diagrams for first and second situations according to Pilot Rules for 1907.

308. Describe fifth situation of same rules.

309. One steamer is steering NE and another NW; the one steering NE has the one steering NW on her port side and is crossing her course. The one steering NE blows two blasts of her whistle and the one steering NW answers with two blasts. Which one crosses first?

310. Supposing in the above case there was danger of collision which steamer would have to give way to the other, and which way would she put her helm?

311. Supposing the steamer steering NW would not assent to the signal of two blasts, what then?

312. Explain sixth situation of diagrams of rules.

313. What do you understand by fourth situation of diagrams?

314. What is the principle of the rules of the road, that is, what is the foundation of same?

315. Under all conditions which steamer must give way to another?

316. Can this rule be reversed when both steamers agree to it?

317. What is a statute mile?

318. How many feet in a statute mile?

## NATIONAL RIVERS AND HARBORS CONGRESS

On Wednesday, Dec. 4, 1907, at the New Willard Hotel, Washington, D. C., the fourth convention of the National Rivers and Harbors Congress was opened in the presence of many distinguished personages, including governors of states, representatives of foreign powers and members of congress as well as nearly 3,000 delegates, representing practically every state in the union, and including delegates from Alaska and Hawaii.

The Hon. Joseph E. Ransdell, who is president of the association, presided over the meeting and in bringing the convention to order dwelt briefly upon the policy of the National Rivers and Harbors Congress, saying:

"The National Rivers and Harbors Congress is, as you know, laboring to bring about a reform in river and harbor legislation, and to place same on an annual and increased basis, favoring no special section or project but advocating a policy that will admit of appropriations to improve all meritorious waterways, no matter where located.

"In view of the impetus given this movement by significant occurrences of the past year, chief of which was the appointment by President Roosevelt of a waterway commission and his recent utterances favorable to river and harbor improvements, at the great waterway convention held at Memphis, Tenn., we believe that the time is opportune and the conditions ripe to use every influence possible with the members of the incoming (sixtieth) congress to have them go to Washington pledged to favor river and harbor legislation at the next session, and we respectfully ask your aid to bring about this much desired condition by either personally interviewing or writing a strong letter to your representative in congress stating your desire that he pledge himself to favor and work for a river and harbor bill at the first session of the sixtieth congress, which convenes on Monday, Dec. 2, next.

"If by the action we request you to take, we can secure a river and harbor bill enacted into law at this next session, following the one passed at the fifty-ninth congress, it will mark a long step forward in the campaign to put river and harbor appropriations upon a *regular annual basis*."

President Ransdell in introducing the first speaker, Secretary Root, of the state department, referred to the work of the national administration in

promoting trade relations with foreign countries, particularly with those lying to the south, and referred in complimentary terms to the achievements of Secretary Root in promoting these relations. Secretary Root was received with much applause and spoke extensively, beginning his speech by deprecating what he termed the unmerited criticism and derision usually directed toward river and harbor appropriations.

"The fact is," he said, "that our people are so busy in their own affairs that the inhabitants of each section of the country understand little of the needs and interests of people of other sections. We take our ideas of what is going on at a distance from our own homes through the most cursory glances at the headlines in the newspapers, and the newspapers tend to present in their columns, especially in their headlines, the worst things that are happening in our country. We see accounts of murders and suicides, and divorces and scandals—these are featured in the newspapers—and so every abnormal feature of the rivers and harbors bill has been made the most of, and these abnormal features, rather than the normal features, are the things the people of the United States have seen and thought about.

"We have come to hear a great deal about the 'pork barrel' in connection with these matters, as though the rivers and harbors bill were the result of a combination of members of congress to secure appropriations for the needs of their own districts. It is time something should be done—something definite and positive—that the people may understand that the improvement of the rivers and harbors of the United States is not a mere barter among politicians, but is a matter of great public policy."

Secretary Root declared that the people were ready and willing to spend money for the improvement of waterways. He instanced their approval of the Panama canal project and of the ship canal in the state of New York.

"Let us have created by the common action of the people of the United States the best opportunities to get their products to the point of shipment, and, after they get them to the ocean, let us have an American merchant marine that will take our products and extend our commerce all over the world."

M. Jussraud, the French ambassa-

dor to the United States, was the next speaker, who said in part:

"We hold the record for the present. You will hold it in your turn when the great Panama canal is finished. We turned the first sod. You will turn the last, and no one will applaud more heartily than your predecessors."

The ambassador then reviewed the history of the efforts made by France in the improvement of waterways and the resultant benefits to commerce. He said that the greatest era of canal building in France is the present, and the aim has been to complete, to unify, to cheapen. The rule now is to have throughout France free canals, as they have free roads.

He said in conclusion: "Do you want to have navigable rivers or do you prefer to have torrents that will destroy your crops and never bear a boat? If you prefer the first, then mind your forests. We can tell you, for we know."

Following M. Jussraud came Francis G. Newlands, United States senator from Nevada and a member of the inland waterways commission, who spoke of the power that such meetings possess for forming public opinion. He roused the convention to great enthusiasm by explaining the principles of the bill which he was about to introduce in the senate, and which was in fact so introduced by him and twice read in that body before being laid on the table.

This bill provides for an inland waterways fund and calls for an immediate appropriation to this fund of \$50,000,000. It provides also that when this fund falls below \$20,000,000 the president will have power to make up the deficiency.

It provides that the president shall cause an examination of all projects now under way, such as forestry, irrigation, swamp land reclamation, clarification of streams and utilization of water power, so that the work may be co-ordinated. The commission charged with the disbursement of the fund will have authority, with the approval of the president, to enter into actual construction work without further action by congress.

Following Senator Newlands came Martin A. Knapp, chairman of the interstate commerce commission, who was introduced as one who could speak by authority on the question of transportation of this country. He said he felt that no man could afford



to keep silence when a crisis was presented, and he believed that such a crisis was presented at this time. He pointed out that the transportation interests of America exceeded 4,000,000 tons in every 24 hours, and that they were advancing every day. Unless this traffic is able to be carried, he inquired, what possible use is there to produce it? He pointed out that it was beyond the physical power of railroads to increase their transportation facilities in the immediate future, and continued:

It is not a question of rights of way, of locomotives, of general equipment, but of terminal facilities of railroads. It has been found that a capitalization of \$150,000 a mile on Manhattan Island would be necessary to provide adequate facilities for the transportation or for the handling of the freight traffic. One-half of that amount would pay for the construction of immense waterways in the country.

We would make our profit by carrying our products to the nations of the earth. What is to be the situation if 30 days are required to carry products of this country, for instance, from Buffalo to New York via the Erie canal? We must look to an increase of our inland transportation by water if we are to be able to compete with the other nations of the world in foreign commerce.

At the conclusion of Mr. Knapp's address the first session of the National Rivers and Harbors Congress convention was adjourned for the noonday recess.

#### WEDNESDAY AFTERNOON.

Upon reconvening for the afternoon of the first day's session the report of the committee on credentials was presented, after which the meeting was addressed by the Hon. Cyrus P. Walbridge, ex-mayor of St. Louis.

Mr. Walbridge brought the greetings of the Lakes-to-the-Gulf Deep Waterway Association. He spoke of the project to connect Chicago with New Orleans by an inland water route. He recommended that congress be requested to issue \$500,000,000 of United States bonds for the work the rivers and harbors congress proposes.

Mr. Walbridge was followed by Gustave Schwab, New York representative of the North German Lloyd Steamship Co., who spoke of "Foreign Commerce and Rivers and Harbors."

He said that the importance of foreign commerce in the life of nations scarcely could be overestimated, not only because the prosperity of a peo-

ple depended upon such commerce, but because the exchange of products brings with it an intercourse that broadens the ideas of the people and fosters international good feeling.

"Forty years ago," said Mr. Schwab, "the largest steamships employed in ocean carrying trade between New York and Europe measured 3,389 tons register. Now 77 steamers, all from 10,000 to 24,000 tons gross register, are engaged in the lines of transportation between New York and Europe, besides a large number of vessels under 10,000 tons gross register.

"The increasing demands of the foreign trade of our country will in a short time be gratified by the completion of an improved channel from the harbor of New York to the sea, which will prove one of the most important factors in the enlargement and extension of the foreign commerce of the United States through the increase in the size of the carrier and the consequent reduction in ocean freight rates that this great channel will render possible."

Ex-Governor George C. Pardee, of California, next addressed the congress. Gov. Pardee spoke on "Rivers and Harbors Begin in the Mountains." He told of how he had the good fortune some time ago to take the "most distinguished gentleman in the United States" through the forests of California. He said this visitor, on seeing the devastated forests, had inquired who might be responsible? The governor replied: "The lumberman." Then, after a time, they came to a bare place in the woods, where waters in time of heavy rains gushed in torrents because of the lack of trees. Again the guest asked who was responsible. Again the governor replied: "The lumbermen." After a time, guide and guest penetrated through a portion of forest that was burning. After they had gone quite through, the guest asked the same question for the third time. The governor replied as before: "The lumberman." Then the guest, the governor said, quite audibly, so that even the little birds in the trees might hear, remarked: "Damn the lumberman!"

President Ransdell then introduced John Barrett, director of the International Bureau of American Republics, who delivered an address on the "Waterways of Other Americas."

He pointed out the fact that the republics of Brazil, Uruguay, Argentine, Chile and Mexico are spending collectively more money and following a more systematic plan for the permanent improvement of the rivers than is the great United States, having now under way harbor and channel construction for which direct ap-

propriations of not less than \$100,000,000 have been made, and these same governments announce that they have only begun the vast scheme of improvements which they contemplate. Mr. Barrett asked to be permitted as director or chief of the International Bureau of American Republics, to point out in a word the great but unappreciated value to the United States of this field of Latin America as a commercial opportunity. He said: "Last year our 20 sister republics, of which our ignorance is so profound, carried on a foreign trade amounting in round numbers to \$2,200,000,000, or more than one-third of the total foreign commerce of the entire western hemisphere. Of this trade of Latin America the share of the United States, which has the best opportunity of all countries in its relations with them, was \$600,000,000.

"If we are to spend \$500,000,000 on the Panama canal, we must devote a similar sum to our rivers and harbors, so that we can take proper advantage of the canal when it is done."

John M. Stahl, of Chicago, ex-president of the Farmers' National Congress, was the next speaker. Mr. Stahl occasioned some merriment by saying that the first man who conducted water transportation was Noah, who was also a farmer. He said that the farmer is heartily in sympathy with the movements contemplated by the association.

The next address was made by Dr. N. G. Blalock, of Walla Walla, Wash., who spoke of the Columbia river as second only to the Mississippi. He said that the transportation problem must be solved through the development of the rivers and inland waterways, and not alone by the regulation of railroads.

This address concluded the session for Wednesday afternoon.

#### WEDNESDAY EVENING.

At the Wednesday evening session, J. C. Welliver, of Iowa, a newspaper man, who recently investigated the deep waterways and the transportation question in Europe, was the first speaker. Mr. Welliver told of the encroachment upon the waterways by the railroads in a number of foreign countries, necessitating their protection by the government. Similar protection would have to be afforded the waterways of this country against the railroads, he said, if the United States is to keep its rank in the world's commerce.

Mr. Welliver was followed by Chief Forester Gifford Pinchot, who spoke of the three great movements before the American people—the waterways

movement, the forestry movement, and the making of public lands into places for homes.

Albert Bettinger, of Cincinnati, who was one of the prime movers in the reorganization of the National Rivers and Harbors Congress several years ago, was the next speaker. Mr. Bettinger spoke first of the Ohio river and the great territory tributary to it. He painted the picture of the great resources of that stream, and told of the industries that line its banks. He also spoke of the meeting of the congress in his city in 1905, at which time the policy of agitation was decided upon and which had spread all over the country. He said that it is now time for the representatives of the people in the federal congress to show why these improvements shall not be made and called upon any member of congress present to come upon the stage and debate the question as to why the government should not issue bonds to complete the river and harbor work in the United States when it has already done so in the case of the Panama canal. No congressman, however, appeared to take up the cause.

The last thing upon the program for the evening was an illustrated lecture upon some of the greatest seaports of Europe, given by Thomas S. Anderson, of Boston. These views showed the great facilities of Liverpool, Glasgow, Hull, Belfast, Havre, Hamburg, Bremen, London, Antwerp, Rotterdam and other continental and island ports.

#### THURSDAY MORNING.

At the opening of the convention on Thursday morning, Governor Dawson, of West Virginia, was the first speaker. He referred briefly to such improvement of the rivers of West Virginia as had already been made and he said that if the streams were improved further they would open to the world undreamed of resources, and wealth and prosperity.

Following Governor Dawson the convention was addressed by the Hon. Robert B. Glenn, governor of North Carolina. Governor Glenn said that \$6,500,000 could be saved on present productions if producers and manufacturers were accorded competent facilities for transporting their products.

"Not only are the railroads unable to afford the transportation needed but the rates by water in comparison to those charged for land transportation are ridiculously low. I mention an instance. Where producers pay 90 cents per ton for a distance of 135 miles for iron on railroads, they are

charged but 35 cents per ton for a distance of 1,000 miles by water. This fact alone should awaken officials to the importance of this great subject. Last year it cost \$86,000,000 to dig out the great lakes to allow boats of larger tonnage to enter different ports. Through this expenditure the government has benefited to the extent of \$136,000,000 in trade."

Governor Glenn was given a rousing ovation at the close of his address.

The next speaker was W. W. Finley, president of the Southern railway, whose name has appeared frequently with that of Governor Glenn, in connection with the rate controversy in North Carolina, his subject being the "Economic Relations Between Waterways and Railways." He spoke of the relations existing between the two modes of transportation, water and rail, and said that each had been benefited by the prosperity of the other. He spoke of the policy of his own road of encouraging coastwise steamship lines, and in conclusion said: "I believe that the solution of the problem is to be found in the adoption by the general government of a broad and comprehensive plan for the improvement of the rivers and harbors of the country to be carried to completion as rapidly as the work can be done advantageously and by the adoption by federal and state governments of such railway regulation as will involve the minimum of interference with the operation of economic laws consistent with the protection of the buyers of transportation and the public generally from wrong."

President Finley was also given an enthusiastic reception.

Chairman Ransdell in presenting to the congress Representative Theodore E. Burton, of Ohio, chairman of the rivers and harbors committee of the house of representatives, said that the country had reached its present high plane in the improvement of internal waterways materially through the efforts of Mr. Burton. The delegates rose and cheered Mr. Burton heartily.

Mr. Burton declared that the movement for the improvement of the inland waterways had been stimulated by the unparalleled growth of the country in its resources. He said there was an admitted inadequacy in the transportation facilities of the United States, and it was with a purpose of improving the facilities that such congresses as this had taken up the work. He said that the national congress had eliminated "log rolling" in

behalf of special projects, and that such individual projects were now allowed to take care of themselves. He believed it unquestionable that appropriations for the improvement of rivers and harbors would be increased in the near future, because it was conceded by all who had devoted study to the matter that the railroads were unable to care for all the freight offered for transportation.

"We are going ahead by leaps and bounds," said he, "and we have come upon a time when the railroads of the country cannot begin to take care of the traffic. In this situation the internal waterways are not only convenient, but necessary. The field of operation for railways and waterways will be divided naturally between them."

"This is a great national policy which we are advocating which must not be divided in proportion to the population or the wealth of states. In my opinion we should avoid the making of dribbling appropriations for any particular project, but once a project is begun it ought to be finished."

Mr. Burton said: "I can stand by your platform of \$50,000,000 a year. Of course, that question can be answered only by concrete conditions. We must cut out visionary projects, and such an operation will necessitate some one's standing up against them."

John M. Parker, of New Orleans, then delivered a brief address on the development of the lower Mississippi river. He said that with the construction of proper levees the south would be in position to maintain its supremacy in the cotton production of the world, and he urged the congress to lend its influence to the movement for the adequate improvement of the greatest waterway on this continent.

#### THURSDAY AFTERNOON.

At the afternoon session on Thursday, Lieutenant Governor A. B. Davidson, of Texas, addressed the convention, speaking of the inadequate railroad facilities of the state of Texas and the southwest and said that the relief must come through improving the rivers, streams and bayous.

Mr. Davidson was followed by George Clinton, of Buffalo, an active worker for improvements to waterways, in introducing whom President Ransdell referred to the Erie canal as the greatest piece of constructive statesmanship ever undertaken by a single state. He spoke of Mr. Clinton as the grandson of the original promoter of that great waterway, on which the state of New York is now expending \$101,000,000.

Mr. Clinton urged the adoption of a general policy in the development of the waterways of the country, and he pointed out that the development of the Erie canal has acted as a regulation of freight charges not only between the east and the west but between the north and the south. New York, he said, was not asking for anything except just proportion of the appropriations made for harbors, but it realized that there must be a unity of plans and a unity of construction of inland waterways, and that, therefore, the work must be done under the supervision of the national government.

Governor John A. Johnson, of Minnesota, spoken of as a possible candidate of the Democratic party for the presidential nomination, delivered one of the most scholarly addresses that was heard by the congress. He pointed out that the traffic of the country had already overburdened the railroads and that the only relief was through the medium of water transportation.

A notable feature of this session was the address delivered by James J. Hill, president of the Great Northern railway, who was introduced by President Ransdell as a "wizard of transportation and one of the greatest railroad builders in the world." Mr. Hill created great enthusiasm by declaring that the railroads would cordially support any proper plan for the development of the legitimate waterways of the United States. He declared that all the railroads asked was permission to conduct their business in a proper way under fair regulations and laws.

In beginning his address Mr. Hill said it was a canal which made the city of Duluth the third largest port in America. "It follows," he said, "that we must prepare to utilize the waterways of the country as common carriers, and to this end one of the projects that we must see carried to a conclusion is that of a channel from St. Louis to New Orleans of at least a depth of 15 ft.—and 18 ft. would be twice as good. While the traffic of this country is increasing at the rate of 12 per cent annually, the ability of the carriers of that traffic is increasing only 2½ per cent annually. It would be necessary for us to build immediately 75,000 miles of new railroads in order adequately to meet the traffic conditions of the country."

Mr. Hill said that such a task, in present conditions would be almost impossible, on account of the difficulty in obtaining proper terminals and the money and labor to build the roads. It was evident, he said, that more points of export were needed and that these could be obtained only through the utilization of waterways. He believed that the con-

struction of a ship channel between the lakes and the gulf would do more toward relieving the traffic congestion of the northwest than any other one thing.

Calling attention to the fact that in the last few years the increase of railroad mileage in this country had been 22.7 per cent, while the increase of traffic had amounted to 126.4 per cent, Mr. Hill said the wonder was that the entire business of the country had not been paralyzed, because the railroads had nearly exhausted their resources for public service. He pointed out, also, that freight rates were continually declining, while wages and operating expenses were increasing. This, he believed, was the reason for the withdrawal of much capital from railroad building, and he said it would be necessary in some way to remove this lack of confidence before much could be done to promote railroad construction.

"In seeking relief," he said, "we naturally must turn to the waterways of the country, and I believe that they are about to emerge into an era of great usefulness. The overtaxed railroads must be supplemented by every possible method of water transportation. Nature has indicated that the commerce of the great middle west should be carried, to a large extent, by the Mississippi river, and this highway constitutes the most natural exit out of our present transportation dilemma."

Mr. Hill said it would be necessary to provide a sufficient channel for the carrying of vessels of large capacity.

"No craft that floats," said he, "which carries only 1,000 tons can compete with a box car, but with a craft of 10,000 tons the situation is mastered. There will be plenty of business for both waterways and railroads. The alleged jealousy of the railroads of the waterways is a myth and is only a part of the yellow ideas that have been fostered in recent years. You may be assured of the hearty support of the railroads in the construction of the legitimate waterways of the country."

On account of the illness of Charles Emory Smith, of Philadelphia, he was unable to deliver the address assigned to him, his place on the program being filled by J. Hampton Moore, also of Philadelphia, president and founder of the Atlantic Deeper Waterways Association. He spoke particularly of the project for the construction of a canal from Boston to Beaufort, N. C., and thence to Florida. By this route he hoped to see the time when the circle of commerce would be completed and that of the east would meet that of the west and northwest in the waters of the Gulf of Mexico.

Governor A. B. Cummins, of Iowa, in a forceful address declared it to be evident that the United States must either stop doing business or must bring to the railroads the mighty help of the waterways of the land.

Referring to Mr. Hill's statement that capital was hesitating to go into the business of railroad construction, Governor Cummins said that the people with money were hesitating to put their capital into the railroads because the railroads were overcapitalized.

Arthur Knox, chairman of the committee on Commerce and Waterways of the North Side Board of Trade of the City of New York, in his address emphasized the fact that New York is firm in the belief that it is only by co-operation with New England and the west and south that the great improvements desired can be accomplished, but also pointed out that while the constitution of the congress forbade the fostering of sectionalism, still each member would and should use his influence to push the projects of his own locality. Mr. Knox set forth the needs of New York harbor at some length and closed with a plea for specialization of purpose on the part of the members from the various districts.

An interesting contribution to the congress was the address of Governor Comer, of Alabama. He spoke particularly of the development of the Mississippi river as a project of national importance and assured the congress that the people of the south stood cordially behind the work being done by this organization.

#### THURSDAY EVENING.

Governor Hoke Smith, of Georgia, the principal speaker at this session, met with an enthusiastic reception. Governor Smith stated that he had no particular scheme to advocate and assured the congress that the section he represented is thoroughly in sympathy with the objects sought to be achieved.

Leroy Percy, who was to have addressed the convention previously, spoke at this juncture and following his address O. P. Austin, chief of the bureau of statistics of the department of commerce and labor and also secretary of the National Geographical Society, took the assemblage on a trip around the world with stereopticon and moving pictures. He lectured on the new and old ways of travel and held the attention of the large gathering for the balance of the evening.

#### FRIDAY MORNING.

At Friday morning's session telegrams and letters from various absentees conveying their regrets and assuring their co-operation, were read to the congress, including messages from Andrew Carne-

gie, Baron Speck Von Sternberg, German ambassador to this country; Governor Hughes, of New York, and Governor Blanchard, of Louisiana.

An invitation to the congress to hold its next convention in San Francisco was extended by Hon. George C. Perkins, United States senator from that state, and was ably seconded by a message from the Ship Owners' Association of the Pacific coast, as well as by telegrams from the San Francisco Chamber of Commerce, Manufacturers' and Producers' Association and Rufus P. Jennings, director of the congress for California.

John A. Fox, of Arkansas, special director of the congress, in his report said that he was satisfied that if the United States congress was in possession of the information which he had presented, the work of the Rivers and Harbors Congress would have been practically accomplished. He urged the appropriation by the association of \$40,000 for the continuance of its work during the coming year.

J. F. Ellison, secretary-treasurer, presented his annual report, in which he gave the expenditures during the past year. The balance on hand was \$2,272.

The report of the committee on resolutions was then read, as follows:

#### REPORT OF COMMITTEE ON RESOLUTIONS.

After a year's consideration of the aims and purposes of the National Rivers and Harbors Congress as expressed in the resolutions adopted by that body in 1906, the American people have given them emphatic endorsement by sending to this convention assembled at the national capital, Dec. 4, 5 and 6, 1907, nearly 2,000 delegates from 37 states and territories, representing the commercial, manufacturing, producing and consuming interests of the country, and these delegates are unanimously of the belief:

First—That profitable and successful commerce is absolutely dependent upon economical transportation of commodities, and that the importance of transportation will increase with the growth of population and the development of the nation's resources.

Second—That the railroads of the United States are now unable to handle the business offered them and much loss results from the congested condition of traffic; that according to high railroad authority the business of the country has increased over 100 per cent within 10 years, while the facilities for handling it by rail have been increased only about 20 per cent, and, as the railroads cannot be expected in the near future to increase their facilities sufficiently to relieve the situation, other means of transportation should be provided at once.

Third—That transportation of heavy

commodities by water on all rivers and inland waterways is much cheaper and usually quicker than by rail; that no country in the world has been so blessed by nature with water sources as our own, and that if properly improved and connected by canals, they would furnish a convenient means of shipping enormous volumes of freight, thereby relieving the congestion on the railroads and furnishing cheap and safe transportation for the benefit of producer and consumer.

Fourth—That the time has come when the policy of the federal government towards waterways over which it rightly has supreme control, should be more liberal, persistent and continuous than heretofore; that as a result of intermittent action meritorious works of importance begun many years ago are still far from completion; that appropriations for rivers, waterways and harbors have been made at intervals of three years instead of annually; that for the past 10 years they have averaged only about \$22,000,000 a year, or less than 3 per cent of the average annual expenditures of the government, and that enough money should be appropriated each year for at least the next 10 years, properly to improve the various rivers, waterways and harbors on plans which have been and shall be surveyed and approved by the government engineers and authorized by the congress of the United States.

Therefore, Be it resolved by the National Rivers and Harbors Congress, at the present session, containing delegates of every shade of opinion and representing every business interest in the land, standing for a policy, not for a project:

First—That we earnestly urge the adoption by the federal government of a wise, liberal and comprehensive waterway policy that will provide for the proper improvement, within the next 10 years, of the rivers, waterways and harbors of our country, the improvement of which is justified by present and prospective benefits to commerce.

Second—That without presuming to prescribe the engineering or the financial details of his great undertaking, this congress strongly urges upon the congress of the United States the importance of the immediate adoption of a comprehensive plan of waterway improvement, of the carrying on of the work by an adequate number of engineers, and of such liberal appropriations annually as will insure the early completion of such projects as may be undertaken.

Third—That we cordially endorse the action of President Roosevelt in appointing a special inland waterways commission, being confident that its report will

prove a source of accurate and valuable information to the American people. We further recommend that congress enact such laws as will make the inland waterways commission permanent, and will provide it with necessary authority for its investigation and recommendation.

Fourth—That this congress cordially thanks President Roosevelt for the support he has given to its purposes, by his speeches and by his treatment of the subject in his recent message to congress.

Fifth—That we ask congress to view the river, waterway and harbor appropriations not as the appropriation of money for the current expenses of government, but as an investment in permanent improvements, bound to pay increasing dividends from year to year. Viewing these appropriations in this light congress is fully warranted in authorizing an annual expenditure, beginning at the present session, of not less than one-tenth of the amount of money required for all the various river, waterway and harbor improvements already planned and approved by the engineers in charge or hereafter planned and approved, in order that the work may be carried to speedy completion, such appropriation to be not less than \$50,000,000 annually, and congress is further warranted in authorizing the expenditure of the money as needed and in providing for the same, if in excess of funds available, by a bond issue similar in character to that for the building of the Panama canal, whereby part of the cost of these vast improvements will be spread over a succession of years and borne by all who share the benefits.

J. HAMPTON MOORE.

*Chairman.*

Edward C. Plummer, of Maine, presented a minority report urging upon the federal congress "action which shall immediately begin the work of developing our interstate waterways upon a plan treating them all as a single great system, to be brought to completion within the shortest time; that to this end an annual appropriation of not less than \$50,000,000 be made and expended for that purpose; and that we pledge to congress our earnest and active support of whatever method of financing this undertaking the national legislature may approve."

Without discussion, the majority report of the committee was adopted.

A special resolution was also adopted on motion of Teal, of Oregon, as follows:

Whereas, Our distinguished president and leader, Honorable Joseph E. Ransdell, has by his loyal and unfaltering devotion for years to the cause of waterway improvements awakened a profound



interest throughout the United States in the importance of this great work, and has with patriotic unselfishness given a large portion of this time in educating the people to a realizing sense of its necessity; and

Whereas, Captain J. F. Ellison, as secretary-treasurer, and John A. Fox, as special director of the organization have also devoted their energies and time to the forwarding of this great work and have been largely instrumental in arousing a favorable sentiment; therefore, be it

Resolved, That we as members of this congress, in behalf of the organization and people represented by us and of ourselves, tender President Ransdell, Secretary-Treasurer Ellison and Special Director Fox our sincere thanks for the work they have done, and attest our heartiest appreciation of the services they have rendered; and be it further

Resolved, That we pledge to the board of directors of this organization, and to its officers, not only our moral support but such financial aid as may be necessary to carry out the work we have pledged ourselves to accomplish.

The report of the committee on nominations was then read and adopted, as follows:

#### REPORT OF COMMITTEE ON NOMINATIONS.

To the National Rivers and Harbors Congress:

Your committee on nominations respectfully submit the following nominations for officers and board of directors, viz.:

For president: Joseph E. Ransdell.

For secretary-treasurer: J. F. Ellison.

#### Directors:

Atlantic seaboard: Wm. H. Lincoln, Boston, Mass.; Olin J. Stephens, New York; J. Hampton Moore, Philadelphia; Frank D. La Lanne, Philadelphia; F. W. Wood, Baltimore, Md.

South Atlantic seaboard: E. J. Hale, Fayetteville, N. C.; L. B. Dozier, Columbia, S. C.; W. B. Stillwell, Savannah, Ga.

Gulf seaboard: T. G. Bush, Birmingham, Ala.; M. J. Sanders, New Orleans, La.; S. Taliaferro, Houston, Tex.; S. W. S. Duncan, Dallas, Tex.

The entire Mississippi valley district: Gov. J. A. Johnson, St. Paul, Minn.; Thos. M. Wilkinson, Burlington, Ia.; W. P. Kennett, St. Louis, Mo.; W. K. Kavanaugh, St. Louis, Mo.; Charles Scott, Rosedale, Miss.

The great lakes district: James H. Davidson, Bay City, Mich.; E. W. Wickey, East Chicago, Ind.; H. C. Barlow, Chicago, Ill.; Edward H. Butler, Buffalo, N. Y.

Ohio valley district: W. B. Rodgers, Pittsburg, Pa.; Albert Bettinger, Cincinnati, O.; John L. Vance, Columbus, O.; W. H. Keller, Evansville, Ind.

Tennessee and Cumberland district: M. T. Bryan, Nashville, Tenn.

The Arkansas valley district: John A. Fox, Arkansas.

The Missouri valley district: Lawrence M. Jones, Kansas City, Mo.; George C. Call, Sioux City, Ia.

The Pacific coast district: Dr. N. G. Blalock, Walla Walla, Wash.; A. H. Devers, Portland, Ore.; George C. Pardee, Oakland, Cal.

Respectfully submitted,

EDGAR C. ELLIS,  
Chairman.

At this juncture a letter from Secretary of the Treasury Cortelyou was read, expressing regret that he would be unable to attend the congress. He wrote:

"While at the moment I am not encouraging any further inroads on the national treasury, I am very glad to have the opportunity of expressing my deep interest in your meetings and in the work in which your convention is engaged. Conference, interchange of views and co-operation are most helpful in such undertakings, not alone because they make for progress in thus coming together from the different sections of the country, but because they contribute to a better understanding of the needs and opportunities of all of our people. A few days ago I took occasion to say to one of our largest commercial organizations that out of our financial disturbance had come a spirit of co-operation that promised well for the future. May that spirit be more and more evidenced in your relation to the people and in the relation of the people to you."

After open discussion of various subjects had been concluded, the congress adjourned, and at 2.30 p. m. the delegates were received at the White House by President Roosevelt. At that time the resolutions of the congress were presented to the president by Col. John L. Vance, president of the Ohio Valley Improvement Association. This concluded the program of the fourth annual convention, being the third since the reorganization, of the National Rivers and Harbors Congress.

The gist of the congress' recommendations is a plea for an annual appropriation of at least \$50,000,000 by the congress of the United States, for the purpose of improving the various navigable waterways of the country. No particular project was advocated by the convention, the recommendations of the committee on resolutions, adopted unanimously, being that a national policy for the improvement of waterways be adopted by the legislative branch of our government.

#### SHIP YARD NOTES.

The Sharptown Marine railway, Sharptown, Md., has a 200-ft. barge under construction for T. J. Hooper and other Baltimore interests.

The Pusey & Jones Co., Wilmington, Del., has been awarded contract by the Isthmian canal commission for the construction of a stern wheel towboat at a cost of \$25,493.

The city of Boston will soon call for bids for the construction of a new fireboat, the plans for which have been prepared by William T. Keough. The boat will be designed with a view to withstand especially heavy service during the winter months.

The whaling steamer which the Heath ship yard, Tacoma, Wash., is about to build is to the order of the Whales Products Co. and will cost \$60,000. She will be 100 ft. over all, 19 ft. 2 in. draught and 11 ft. molded depth and is to be ready for launching about March 1.

The Sharptown Marine railway, Sharptown, Md., still has on hand the burned hull of the four-masted schooner Cohasset, which it purchased after it had burned and sunk in Baltimore harbor, for the purpose of rebuilding, but owing to the press of other work has been unable to begin work upon it.

The Newport News Ship Building & Dry Dock Co., Newport News, Va., has recently been awarded contract by the Norfolk & Washington Steamboat Co. for building a steel passenger steamer 305 ft. long and 52 ft. beam, which will cost about \$400,000. The steamer will have a speed of 20 miles an hour and is designed for service between Washington, Old Point Comfort and Norfolk, Va.

The New York Ship Building Co., Camden, N. J., will probably be awarded contract for the construction of a new revenue cutter to take the place of the Grant on Puget Sound, as it has submitted the lowest bid for this vessel and a similar one for the Atlantic. The bids were as follows: Newport News Ship Building & Dry Dock Co., Newport News, Va., \$215,000; Fore River Ship Building Co., Quincy, Mass., \$415,000 for both vessels; New York Ship Building Co., Camden, N. J., \$189,000, if both vessels are constructed by this company; Pusey & Jones Co., Wilmington, Del., \$215,000; Maryland Steel Co., Sparrows Point, Md., \$227,000, or \$223,500, if both vessels are constructed at this yard.

## LONG'S COURSE AND BEARING CORRECTOR

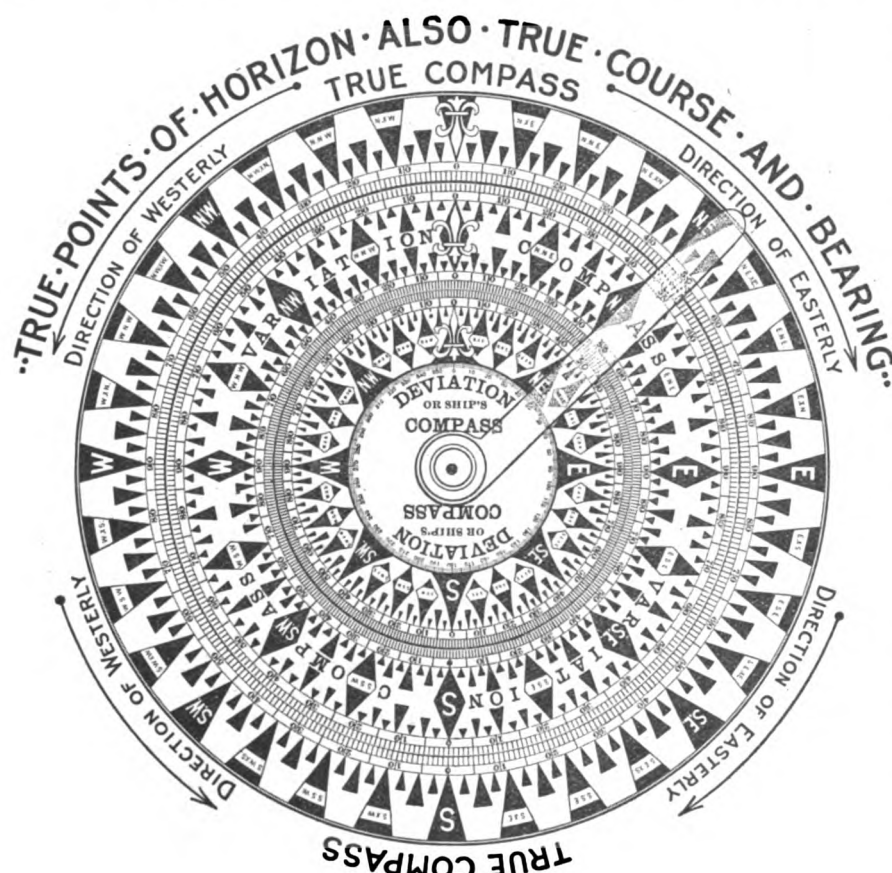


FIG. 1.

The MARINE REVIEW desires to announce that its Course and Bearing Corrector or Indicator is now ready for marketing, and that all orders for same will receive prompt attention. The Corrector is the very best device of its kind on the market and every seaman will find it to his advantage to have one of these instruments.

The demand for a simple mechanical course corrector has grown sufficiently great in the past few years to warrant the production of same. It is to supply this want that the MARINE REVIEW has gone to the expense and trouble of producing a corrector that is especially adapted to the needs of every navigator, whether on the lakes or oceans. The device is for the purpose of mechanically solving many of the simple problems of navigation which daily confront the masters and pilots of all vessels. In laying down courses so many disasters have resulted from a mistake being made in applying the variation or deviation the wrong way, even when the master had perfect knowledge of the rules of such application, that a mechanical device which is absolutely correct under all circumstances, should be viewed with much satisfaction by all navigators. The human mind is liable to error, but a machine

which is correct in the first instance will never make a mistake. When a master has corrected his course for variation and deviation he should have some way of verifying his work. The corrector will do this most satisfactorily.

The corrector is a very handy and useful contrivance, and it will be found especially helpful to the beginner in learning how to correct courses and the reason for the rules. No matter how expert one may be in navigation, the best of them are liable to mistakes when it comes to correcting courses, such as in allowing the variation and the deviation the wrong way. With the corrector there is no chance of mistakes, since all work performed by it proves itself. One cannot make a mistake for the turning of the cards is what corrects the course or works the problem of itself.

The beginner usually finds it very difficult to thoroughly understand the reason for the various rules of correcting the course. Use of the corrector will make this all very plain. One can learn more about correcting courses in one hour with this corrector than in a week's time by the ordinary methods of navigation. The reason for this is that the device pictures every example, and every

move made remains fixed so that it can be referred to from time to time or as required; the operator being able to see every move he makes or is required to make. Another thing, everything is figured from north on each card, and the operator can see at a glance that north on variation card must be turned to the right of north on the true card for easterly and to the left for westerly variation; and the same for deviation, using the red and green cards, that is north on the green card being set with reference to north on red card.

## INSTRUCTIONS.

Outside or square card, compass printed in black, represents true courses and bearings—same as the courses printed on a chart. This card always remains fixed, as true directions never change.

Compass in red and marked variation compass, represents correct magnetic course or bearing. As variation is the difference between true north (true meridian) and magnetic north (magnetic meridian); therefore, if N. on red card is turned aside from true N. by the amount and name of the variation, then any point on the red card coinciding with a given point on the true card, equals the correct magnetic course corresponding to that particular true course according to that particular variation. The same with the red card with reference to the black card; any point on the black card coinciding with a particular point on the red card is the true course corresponding to the correct magnetic course.

The green card marked deviation compass, represents the compass on board ship and is only subject to deviation and not to both variation and deviation, as the compass aboard ship. Deviation is the difference between the magnetic meridian and a line passing through north and south on the compass card; hence, if N. on green card is turned aside from N. on red card by the amount and the name of the deviation, then any point on the green card that coincides with a given point on the red card is the compass course agreeing to that correct magnetic course with that particular deviation. To obtain the correct magnetic course or the true course from the compass course after the cards have been set for Var. and Dev. simply read outward from the green card; to get the compass course from the true course read from the true compass to the green compass. A number of examples will better explain the workings of the corrector:

## EXAMPLES GRAPHICALLY ILLUSTRATED.

To begin with set all three norths together as in Fig. 1.

Example:—True course SE x E, Var. 6 degrees Wly.; Dev. 10 degrees Wly.; what is compass course?

Set north of variation compass (red

card) 6 degrees to the west of north on true compass (black card). Next set north of deviation compass (green card) 10 degrees to the west of north on red card or Var. compass. Holding the red and green cards in place turn radial arm to SE x E on outside compass, and where the same edge of radial arm cuts the red card read the correct magnetic course and where it touches the green card read the compass course. As will be seen from the following illustration, which is a picture of the above example on the corrector, the correct magnetic course is SE  $\frac{1}{2}$  E and the compass course SE  $\frac{1}{2}$  S. See Fig. 2.

Supposing the case of a bearing taken with a compass having a Dev. of 10 degrees Wly. and a Var. of 6 degrees Wly., and an object bore SE  $\frac{1}{2}$  S and you wanted to know its true bearing, so that you could lay it off on the chart. Set your Var. and Dev. cards according to your Var. and Dev. and then holding them in place swing radial arm so that its central edge comes in line with SE  $\frac{1}{2}$  S of green card; where the same edge of the radial arm touches the outside compass read off the true bearing and you have it. See Fig. 2.

Note.—Be sure to use the correct edge of the radial arm, that is its central edge. It is the edge if continued in a straight line would pass through the center of the cards. Facing the radial arm it is always the left hand edge.

#### HOW TO SET THE CARDS.

Lay the corrector flat on a table or other flat surface and hold it in position with the left hand. Then with right hand take hold radial arm (down toward its middle or along the circumference of the red card) and revolve it; revolving the radial arm will turn the cards with it. Set the red card to the variation required by means of the radial arm and when set to the required position, hold it down (also with the left hand—it only requiring a light touch). Set the green card in the same manner—that is, by means of the radial arm. When green card is set as required, hold the green card in position, also with the left hand. Now, set the radial arm to any course required. The cards may also be set without using the radial arm, by simply taking hold of their outer edge with the thumb and first two fingers of the right hand, the thumb on top and the two fingers below. At first the cards and radial arm will work stiff, but a little use will limber them up and make it all the more serviceable.

Be careful at first in handling the radial arm, and especially when it works hard, as it will at first. Take hold towards its middle and revolve it steadily, not jerkily, and also in a manner that will not cause it to twist. The end of the radial arm may be bent or bowed

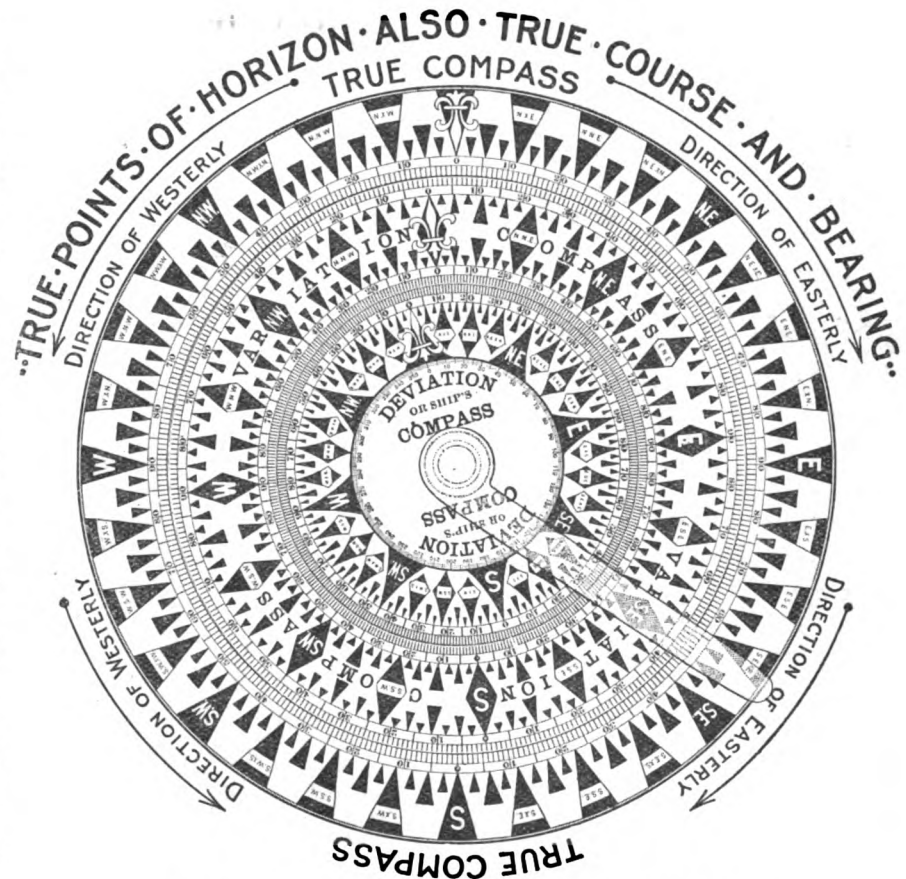


FIG. 2.—SHOWING WESTERLY VARIATION AND DEVIATION.

upward without harm. By giving the arm a steady pull or push there will be no chance of its twisting. The radial arm is transparent, so that all points and degrees are clearly seen through it. After a little practice the operator will get onto his own way of using it, and the above instructions will be unnecessary.

#### GENERAL RULE FOR THE USE OF CORRECTOR.

Set the north point of the red card (with reference to the north point of the black one) in the direction and by the amount of the variation; similarly set the north point of the green card (with reference to the north point of the red one) in the direction and by the amount of the deviation: then any one of the three courses—the true, correct magnetic, or compass course—being given, revolve radial arm till its central edge is upon that course, when the other two are seen on the same edge.

To illustrate: suppose a ship heading N x E, deviation 7 degrees Wly., variation 18 degrees Ely.; required the true and correct magnetic courses: set the N-point of red card at 18 degrees east of the N-point of the card in black (true circle), and, while holding it there, set the green circle with its N-point 7 degrees west of the N-point of the red circle, and holding the two circles with the left hand move the radial arm until its central edge is on N x E of the card in green; then the corresponding divi-

sions in line on the same edge will be found to be: on the red card N 4 degrees E (N  $\frac{3}{8}$  E), being the correct magnetic course; and on the card in black NNE, being the true course.

Suppose at the same time, that the ship were in the vicinity of land, where it was required to fix her position by bearings, while heading N x E, and that to plot these on a chart, the corresponding correct magnetic and true bearings were required: all that is necessary is to turn the radial arm to the compass bearing on the green card and the corresponding correct magnetic and true bearings will be seen along the same edge of arm on the red and black cards respectively.

One of the best uses the device can be put to is in getting the correct amount of the deviation and how to name it, when your boat is heading on a range. The naming of the deviation is always found the hardest for the beginner. The various rules are easily mixed and mistakes are the result. Not only this, but even where one is familiar with the rules, he has no way of proving his work by figures, but by using the corrector the problem is not only solved but proven by a picture of it. If the corrector were of no other value than for the purpose of a proof of one's work, its mission is well filled. It is the proof of one's work that gives him the necessary confidence and self-reliance. How often is the case of the man who has gone along blindly



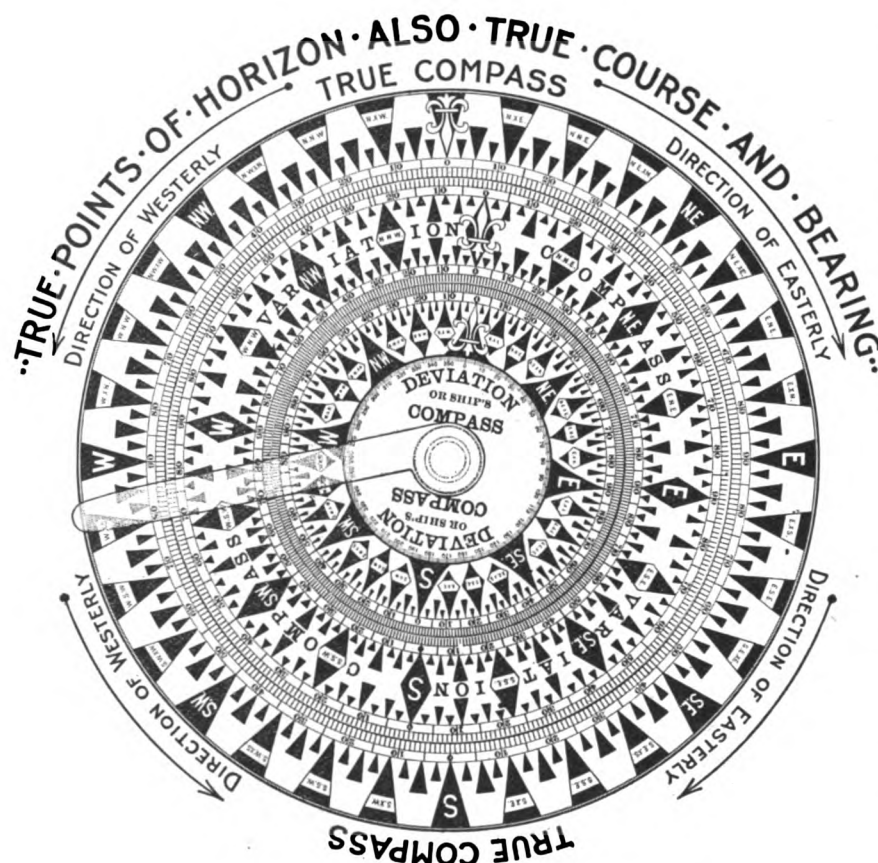


FIG. 3.—VARIATION AND DEVIATION EASTERLY.

for years with the idea deeply rooted that easterly variation is allowed to the right under every and all conditions, and that the compass shows but one kind of course and that is the compass course. It is safe to say that had he learned the first principles of correcting the course on a mechanical course corrector, he would never have run the chance of going wrong. Correct devices, like correct definitions, is the foundation for correct learning. Mistakes frequently occur in the application of the variation and deviation on points south of east and west, when south is made the top of the compass instead of north. With the corrector such mistakes cannot occur. No matter how you face the corrector the directions of easterly and westerly are at once seen and never lost sight of.

Any one that has learned this part of a navigator's work on a corrector of this kind will never forget the rules of application; they will have become indelibly impressed on his mind from seeing them applied in reality.

It is not intended that the corrector should do away with the learning of the rules of course and bearing conversions, but instead, its use is to increase the value of the rules. One should not use the corrector alone, but he should first work the problem in figures and then use the corrector as a proof. There are times, however, when the corrector

should take the place, to a certain extent, of all rules. It is when the navigator is making port, or changing the course at a dangerous turning point, and he must rely on bearings to do it. There are times when a navigator has other duties that occupy his mind besides the correcting of course. At such times the navigator will find the corrector invaluable to him.

To show the importance and the value of a corrector at such times, let any one propose to himself a simple problem (simple when worked on the corrector) as; ship heading NNW, Dev. 17 degrees Wly. and Var. 4 degrees Ely., what are the true and correct magnetic bearings corresponding to SE  $\frac{1}{4}$  E and SW  $\times$  S  $\frac{1}{2}$  S; and he will realize at once the facility of the mechanical over the mental process, with the unfailing correctness of the former, in addition; and not only this, it is done quickly and accurately, thus affording the confidence necessary in carrying out one's work properly.

Steering N  $\times$  E, Var. 18 degrees Ely. and Dev. 7 degrees Wly.; first bearing by compass, N E  $\times$  E  $\frac{1}{2}$  E; second bearing by compass, SSE, what are the correct magnetic and true bearings corresponding to first and second compass bearing respectively. Compass bearing NE  $\times$  E  $\frac{1}{2}$  E; correct magnetic bearing, NE  $\frac{7}{8}$  E; true bearing, ENE  $\frac{1}{2}$  E. Compass bearing SSE, correct magnetic bearing, SSE  $\frac{5}{8}$  E, true bearing S  $\times$  E. Simply

revolve radial arm to NE  $\times$  E  $\frac{1}{2}$  E on green card and read off on the red and black cards respectively; then swing radial arm to SSE on green card and again read off on the red and black cards along the same edge, and you have it. What could be more simple than this, and the beauty of it all is that it is perfectly accurate.

The radial arm may be used to represent the line of bearing, or it may be used to represent the ship's head and the lubber point of the compass. In getting the amount and the direction or name of the deviation, the radial arm is used as the ship's head and lubber point of the compass. In correcting the course to be steered or already steered the radial arm is used as the ship's head or the lubber point of compass; in the correction of a bearing the radial arm becomes the bearing range. In getting the amount and the direction of the deviation, set radial arm to the true course or bearing, and hold it there, then set red card according to the amount and direction of the variation for locality as taken from the chart, then set the course or bearing the ship is steering or the bearing taken by compass, as found on green card, to the same edge of radial arm; the difference between the N-point of green card and the N-point of red card establishes the amount of the deviation, and the direction simply depends on which side the N-point of green card is found of the N-point of red card; if N on green card is east or to the right hand of N on red card the deviation is named Ely.; and if N on green card is west or to the left hand of N on red card the deviation is named Wly. This is all there is to it. All these perplexing rules are simple things when worked on the corrector. By the use of the corrector one need only have an inkling of the rules for applying and naming variation and deviation to work all problems of the compass accurately. To learn these things on, nothing can compare with this instrument. The corrector can be used to great advantage in naming the deviation when the ship is heading on a range; simply look on the chart for the true bearing of the range the ship is heading on, and set radial arm to it; then set red card according to the amount and direction of the variation as found on the chart; next set ship's course, as found on green card, to the same edge of radial arm; then the difference between N on green card and N on red card is the amount of the deviation, and its name or direction, simply depends on which side N on green card is of N on red card.

To set variation and deviation circles according to points and quarter points: As the points and quarter points of the three cards of the corrector lie inside



of the degree circles, the same as all compass cards having a degree circle, it may bother the beginner in setting the cards to points or quarter points—that is, in getting the right degree division that is in line with the particular quarter point in question. This is because the points and quarter points do not contain an equal number of degrees, but of minutes and seconds as well. This is easily overcome by the use of the corrector; in fact, the corrector is the only device on which it can be done with any degree of facility. Simply set radial arm to the N-point of outside compass (true circle) and hold it there; then set red card according to the same edge of arm, turning its N-point away from its edge by the amount and direction of the variation. Holding red card in place swing radial arm to N-point of red card and holding it and the red card in position, set green card according to the amount and direction of the deviation, turning its N-point the required number of quarter points away from the edge of radial arm. Bear in mind that variation is the difference between true north and magnetic north (black and red cards of corrector); and that deviation is the difference between magnetic north and compass north (red and green cards of corrector). Example: Var.  $\frac{1}{4}$  point Ely., Dev.  $1\frac{1}{4}$  points Wly. Set radial arm, central side, to N-point of black card, and hold it there, and at the same time revolve red card so that its N-point is turned  $\frac{1}{4}$  point to the right or east of radial arm edge; in other words, N  $\frac{1}{4}$  W on red card will be seen on the same edge of arm. Hold red card in position and shift radial arm so that its central edge is in line with north of red card. Holding arm and red card in this same position revolve green card to the left so that its N-point will be  $1\frac{1}{4}$  points to the westward of the same edge of arm; in other words, N x W  $\frac{1}{4}$  W will be seen on this same edge of the arm. Then holding the two cards in this position swing the radial arm to any course required. Supposing it were required to know the correct magnetic course and the compass course for the true course NE according to the above Var. and Dev. Along the same edge of radial arm will be seen NE  $\frac{1}{4}$  N, the correct magnetic and NE x E, the compass course. Supposing at the same time an object bore SE by compass, what is the correct magnetic and true bearing corresponding thereto? Swing radial arm so that its central edge is directly over SE on green card then on red card will be seen SE x E  $\frac{1}{4}$  E, the correct magnetic bearing, and on the same edge of arm, on black card, will be seen the true bearing, SE x E.

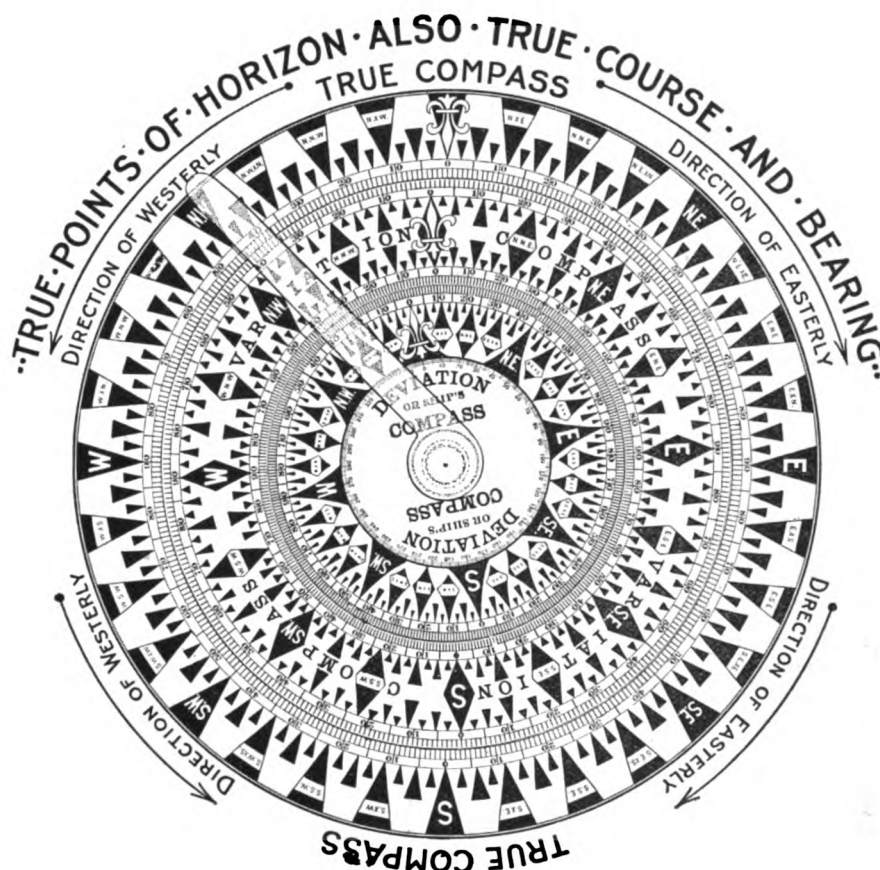


FIG. 4.

## VARIATION AND DEVIATION EASTERLY.

The example shown on the above corrector is as follows: Var. 8 degrees Ely.; Dev. 2 degrees Ely. Radial arm shows true course to be W x S, correct magnetic course W x S  $\frac{3}{4}$  S and compass course WSW. (See Fig. 3.)

The following example and illustration will explain what an easy matter it is to find the amount and name of the deviation when heading on a range. Explanation: Find the true bearing on the chart, and set the center edge of radial arm to this true bearing and hold it there with the left hand. Next, with the Var. given on the chart for the locality, set the red card accordingly; then holding radial arm and red card move the green card so that the same course as shown by compass when heading on the range cuts the same edge of the radial arm. Deviation is always the difference between compass bearing and the correct magnetic bearing, or between magnetic north and compass north, and it is named according to the following rule: If the correct magnetic bearing is to the right of the compass bearing the Dev. is Ely., but Wly. when the correct magnetic bearing is to the left of the compass bearing. On the corrector it is simply the difference between north on the green card and north on the red card. It is Ely. when N. on green card is to the right or east of N. on the red card, and Wly. when N.

on the green card is to the left or west of N. on the red card. The following illustration is a practical example. Vessel heading on a range, chart gives true course NW. (Swing radial arm to true NW and hold it there.) Var. for locality taken from chart 4 degrees Wly. (Turn Var. card to the right 4 degrees and hold it in position.) Now set green card so that the same course the ship is heading when on the range will coincide with the radial arm, then the difference between the norths on red and green cards is the deviation, and it is Wly. if N. on green card is to the left of N. on red card; it is Ely. if N. on green card is to the right of N. on red card. See Fig. 4.

Wly. Var. and Dev. True course NW, Var. 4 degrees, correct magnetic course NW  $\frac{3}{8}$  N; Dev. 10 degrees; compass course NW x N  $\frac{1}{4}$  N. Supposing with the above Var. and Dev. a bearing was taken by compass and it was required to get its true bearing in a hurry to put on the chart; simply set the Var. and Dev. cards according to their name and then swing radial arm to the same bearing on the green card that corresponds to the bearing taken by compass, and where the central edge of radial arm touches the outside card will be the true bearing corresponding to the compass bearing with that particular amount and name of Var. and Dev. Compass bearing NW x N  $\frac{1}{4}$  N, Var. 4 degrees Wly. and Dev. 10 de-



grees Wly.; correct magnetic bearing NW  $\frac{3}{8}$  N; true bearing NW. The above is a full explanation of Fig. 4.

The foregoing examples and methods are only a few of the things that can be performed on the corrector. In writing this explanation the author has discovered a number of other uses for the device. The beauty of the device is its extreme simplicity of operation; the most perplexing problems of the compass become ridiculously simple when worked out mechanically. Getting the correct amount and direction of the deviation is an important duty of every navigator; but there are many who neglect this part of their work, on account of the perplexing rules to be memorized. It is safe to say that anybody who has experienced this difficulty would obviate this trouble were they to use the corrector, either in place or in conjunction therewith. It is simply wonderful the number of difficult things that are made easy on the corrector. The author has used one of these devices and finds it simply invaluable in his work. There is probably no one that is any more familiar with the rules for correcting courses than the writer, yet he would never think of dispensing with the service rendered by the corrector. The corrector not only facilitates one's work, but it is absolutely accurate, and above all is a positive proof in all its work.

There is being published in connection with the corrector a book dealing with variation and deviation in all its phases. The book not only explains all about variation and deviation, their causes and effects, but their application in the conversion of courses and bearings. The book will be the very best of its kind in print, and it will contain more simple and practical instruction and explanation on these subjects than any other book on the market. It is a book for the experienced and inexperienced alike; also for the practical and theoretical man. The book was written more especially as an explanation of the corrector. This explanation and working methods of the corrector is only a sample of what the book contains. The book and corrector will sell together for \$2, or the book alone for \$1, postage prepaid.

Capt. Wm. Mills died at Bay City Dec. 17. He had been identified with lake trade since the 60's. In 1866 he in company with Capt. Ben Boutelle entered the log towing business and soon acquired a large fleet of lake tugs. In later years he owned the steamer A. B. Folsom and schooner Mary B. Mitchell. He retired from active business about five years ago.

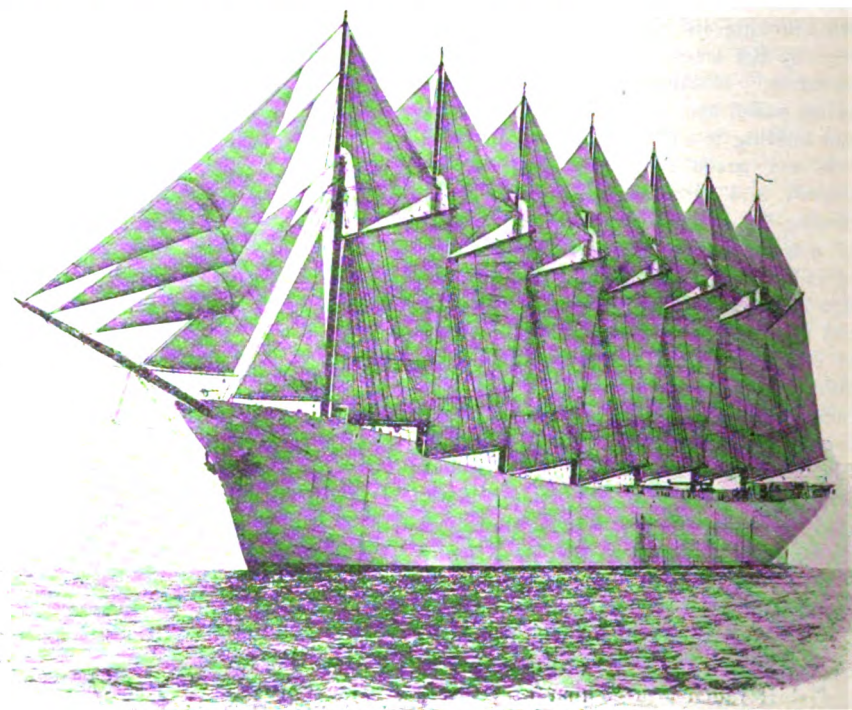
## ATLANTIC COAST GOSSIP

Office of the MARINE REVIEW,  
1005 West Street Bldg.,  
New York City.

The wreck of the Thomas W. Lawson, the largest schooner and only seven-master ever built, in Broad Sound, Scilly Isles, terminates the career of a vessel which has been more or less in the public eye during her five years of existence. Although looked upon by many as the first of a type of vessel which would prove to be a new departure in American ship building, others again regarded her as

The filing of documents in the custom house at Bridgeport, Conn., last Saturday, made public the fact that the Joy Steamship Co. had formally passed to the control of the United States Transportation Co. The transaction involved about \$1,000,000, and the papers indicate that the boats will have Bridgeport as their home port.

Thomas Shields, a New York pilot, was drowned about 5 o'clock Saturday evening through the capsizing of



THE SEVEN-MASTED SCHOONER THOMAS W. LAWSON LOST OFF SCILY ISLES.

a doubtful venture, doomed to stand alone in her class, and pointed to the fact that no other seven-masters have since been built. There can be no doubt, however, that the Thomas W. Lawson was a paying venture, her carrying capacity making her yearly earnings phenomenal. When lost she was under a charter which brought her owners a return of \$78,000 a year, was valued at \$300,000 and was not insured. The Thomas W. Lawson was wrecked on Friday the 13th.

Owing to the heavy weather encountered making the trans-Atlantic passage, the liners due to arrive at New York last Saturday, were from one to three days behind time. The Astoria, of the Anchor Line, owing to temporary disablement and adverse weather, was six days overdue when she made port on Sunday.

the yawl while he was crossing from the steamer Talisman to the steam pilot cutter New York.

Two apprentices who were rowing the pilot managed to keep afloat until the cutter drifted down to them, but Shields sank almost immediately. He was about 50 years old, and lived with his wife and family in Sackett Place, Brooklyn.

When the schooner Harlan W. Huston was run down and sunk off League Island navy yard by the steamship Pawnee, \$500 in cash, owned by Capt. Gaskill, of the Huston, went down with the schooner and was mourned as of doubtful value. The money, however, has since been recovered by a diver, it being found in a desk in the cabin.

The Red D Line steamer Caracas,



from New York for Laguayra, on her arrival at San Juan, Porto Rico, reported passing the schooner Gardiner B. Reynolds, from Wilmington, N. C., for Portland, abandoned. Her decks were awash, and only one mast was standing.

The Gardiner B. Reynolds was owned by F. J. Finckley, of Bath, Me., and her cargo of lumber by Wiley Barker & Camp, of Portland.

The 89th anniversary of the Society for Promoting the Gospel Among Seamen in the Port of New York was celebrated last Sunday in the Mariner's church, New York. Founded in 1818 by the wealthy merchants of the city, the society has gradually grown, until last year the mortgages on the property were paid off. Seamen crowded the church long before the service commenced, making a record attendance.

Nine steamships have been chartered to bring from New Orleans to New York or Philadelphia part of the 40,000 tons of Louisiana sugar recently purchased there by the American Sugar Refining Co. The refiners are in need of raw material, the Cuban season being at an end.

The Cunard Line steamship Mauretania which is bringing 4,000 bags of mail this voyage, grounded in the Mersey on Friday night. She was floated early next morning with the assistance of tenders, divers later going down to examine her bottom. No trace of any damage could be found.

Specifications have been issued by the bureau of yards and docks of the navy department inviting bids for the completion of the dry dock at Brooklyn, N. Y., the contract for building which was recently forfeited by Secretary Metcalf because of the failure of the contractor to finish the work. The bids will be opened Jan. 18. The original estimate of cost of the dock was \$1,000,000, of which amount \$800,000 remains available.

The Clyde liner Mohican arrived at Charleston, Dec. 15, bringing the captain and crew of the schooner Augustus Welt, which foundered at sea on the 14th. The Welt, which is of 1,100 tons, left Carteret, N. J., Dec. 5th, with a cargo of fertilizer materials for Savannah. Heavy southeast gales were encountered off Cape Lookout, and the schooner sprung a leak. The derelict, which may still be afloat, was

deserted directly in the track of the coasters.

The bark Edmund Phinney, laden with railroad ties, went ashore on the eastern side of Sandy Hook during Saturday's storm. While a 60-mile gale was blowing and the weather generally was bitterly cold, her crew was taken off by life-savers after many hours of futile attempts to reach the vessel. The Edmund Phinney will be a total loss.

The Marconi wireless operator at Sable Island, reported to Halifax, N. S., on Monday, a steamer drifting in the vicinity of South Ledges during the forenoon. The steamer, which is supposed to be the abandoned Kildona, had disappeared when the weather cleared, and is supposed to have foundered.

The captain and crew of the Thomson liner Kildona, which was wrecked on Brazil Rock, off Cape Sable, on Saturday last, arrived at St. John, N. B., on the steamer Louisburg. The Kildona left Shields on Nov. 27, with a general cargo for Portland, Me., but struck on the submerged Brazil Rock and was abandoned five hours later.

#### DREDGING IN NEWPORT HARBOR.

Col. J. H. Willard, government engineer, Newport, R. I., opened bids on Oct. 23, for dredging in Newport harbor. The bidders were: John P. Randerson, Albany, N. Y., 40c; W. H. Beard Dredging Co., New York, 29c; the International Contracting Co., New York, 22c; Charles M. Cole, Fall River, Mass., and J. S. Packard Dredging Co., Providence, R. I., 22c. Contract was awarded to the International Contracting Co.

#### CANAL CIRCULAR NO. 402.

Bids received by the general purchasing officer of the Isthmian Canal Commission, Washington, D. C., and opened Dec. 6, 1907, for material and supplies, included the following:

Class 4—One Portable Riveter.	
Chester B. Albee Iron Works, 1115 Market St., Pittsburg, Pa.	\$1,200.00
Hanna Engineering Works, 820 Elston Ave., Chicago, Ill.	775.00
Joseph T. Ryerson & Son, 18 Milwaukee Ave., Chicago, Ill.	959.00
Fox Bros. & Co., 126 Lafayette St., New York	814.00
Manning, Maxwell & Moore, 85 Liberty St., New York	749.90
Motley, Green & Co., 66 Broad St., New York	781.00
Niles-Bement-Pond Co., 111 Broadway, New York	1,800.00
Class 5—Six Pneumatic Riveters.	
Chicago Pneumatic Tool Co., 95 Liberty St., New York	\$1,400.00
Ingersoll-Rand Co., 11 Broadway, New York	1,100.00
Manning, Maxwell & Moore, 85 Liberty St., New York (part)	1,340.00
Motley, Green & Co., 66 Broad St., New York (part)	1,785.00
Class 6—Three Pneumatic Motors.	
Chicago Pneumatic Tool Co., 95 Liberty St., New York	\$ 472.50
Detroit Hoist & Machine Co., Detroit, Mich.	330.00
Ingersoll-Rand Co., 11 Broadway, New York	375.00
Manning, Maxwell & Moore, 85 Liberty St., New York	418.86

Class 7—2,000 Ft. Tubing for Pneumatic Tools.	
George S. Carpenter & Co., 206 S. Water St., Chicago, Ill.	\$ 332.00
Chicago Pneumatic Tool Co., 95 Liberty St., New York	304.00
Ingersoll-Rand Co., 11 Broadway, New York	322.00
National Electric Supply Co., Washington, D. C.	612.00
New York Belting & Packing Co., 91 Chambers St., New York	482.00
Peerless Rubber Mfg. Co., 16 Warren St., New York	404.00
United & Globe Rubber Mfg. Co., Trenton, N. J.	264.00
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa.	266.00
E. F. Keating Co., 453 Water St., New York	292.00
Revere Rubber Co., 59 Reade St., New York	228.00
Class 8—270 Lengths Corrugated Engine and Tender Hose.	
Boston Woven Hose & Rubber Co., Cambridge, Mass.	\$1,107.90
George S. Carpenter & Co., 206 S. Water St., Chicago, Ill. (per ft.)	75c and 90c
B. F. Goodrich Co., 66 Reade St., New York	869.10
Peerless Rubber Mfg. Co., 16 Warren St., New York	873.90
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.	1,050.00
Republic Rubber Co., 47 Warren St., New York	746.55
United & Globe Rubber Mfg. Co., Trenton, N. J.	699.60
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa. (per ft.)	92c and \$1.06
Fox Bros. & Co., 126 Lafayette St., New York	823.80
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York	750.30
E. F. Keating Co., 453 Water St., New York	766.80
Revere Rubber Co., 59 Reade St., New York	898.50
Class 15—One Orange-Peel Dredge Bucket.	
Queen City Supply Co., Cincinnati, O.	\$ 745.00
Jacob Shannon & Co., 1744 Market St., Philadelphia, Pa.	837.00
F. S. Banks & Co., 73 Warren St., New York	647.00
Drew Machinery Agency, Manchester, N. H.	729.00
Fox Bros. & Co., 126 Lafayette St., New York	714.00
G. & W. Mfg. Co., 26 Cortlandt St., New York	569.00
Manning, Maxwell & Moore, 85 Liberty St., New York	706.10
Motley, Green & Co., 66 Broad St., New York	645.00
New Jersey Foundry & Machine Co., 9 Murray St., New York	644.00
Vermilye & Power, 17 Battery Pl., New York	597.50
Class 22—Dredge and Straight Link Coil Chain.	
Bigelow & Dowse Co., 229 Franklin St., Boston, Mass.	\$3,848.00
Columbus Chain Co., Columbus, O.	5,660.00
Handlau-Buck Mfg. Co., St. Louis, Mo.	5,665.30
Hayden-Corbett Chain Co., 250 Fulton St., New York	3,545.60
J. B. Kendall, Washington, D. C.	4,468.00
Lebanon Chain Works, Lebanon, Pa.	3,372.00
Charles E. Robidoux, 1210 Chemical Bldg., St. Louis, Mo.	3,700.00
Standard Chain Co., Bailey-Farrell Bldg., Pittsburg, Pa.	3,074.20
S. G. Taylor Chain Co., 96 Indiana St., Chicago, Ill. (part)	795.20
F. S. Banks & Co., 73 Warren St., New York (part, per lb.)	6.49c and 6.59c
Fox Bros. & Co., 126 Lafayette St., New York	4,582.00
Manning, Maxwell & Moore, 85 Liberty St., New York	3,781.80
Manhattan Supply Co., 127 Franklin St., New York	6,446.17
New Jersey Foundry & Machine Co., 9 Murray St., New York	2,957.40
Sherman, Brown, Clements Co., 78 Murray St., New York	5,820.00
Class 29—2,100 Lbs. Sheet Gum Packing.	
Bowers Rubber Works, 68 Sacramento St., San Francisco, Cal.	\$1,155.00
Continental Rubber Works, 43 Murray St., New York	1,530.00
Crane Co., 624 W. Pratt St., Baltimore, Md.	903.00
Garlock Packing Co., 186 Liberty St., New York	1,680.00
	1,260.00
	693.00

B. F. Goodrich Co., 66 Reade St., New York	766.50
Mechanical Rubber Co., Lisbon Rd., Cleveland, O.	840.00
Mineralized Rubber Co., 18 Cliff St., New York	997.50 1,312.50
National Electrical Supply Co., Washington, D. C.	1,160.00
New York Belting & Packing Co., 91 Chambers St., New York	1,396.50
Peerless Rubber Mfg. Co., 16 Warren St., New York	840.00
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.	798.00
Republic Rubber Co., 47 Warren St., New York	924.00
William G. Stevenson, 110 Race St., Philadelphia, Pa.	903.00
Trenton Rubber Mfg. Co., Box 6, Trenton, N. J.	1,155.00
Francis T. Witte Hardware Co., 106 Chambers St., New York	885.00
United & Globe Rubber Mfg. Co., Trenton, N. J.	1,008.00
Charles Bond Co., 520 Arch St., Philadelphia, Pa.	840.00
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa.	1,280.00
Fox Bros. & Co., 126 Lafayette St., New York	756.00
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York	1,302.00
Manning, Maxwell & Moore, 85 Liberty St., New York	1,281.00
Manhattan Supply Co., 127 Franklin St., New York	2,184.00

Motley, Green & Co., 66 Broad St., New York	882.00
New Jersey Car Spring & Rubber Co., Jersey City, N. J.	1,050.00
Revere Rubber Co., 59 Reade St., New York	1,575.00
Vermilye & Power, 17 Battery Pl., New York	819.00
Class 30—1,400 Lbs. Rubber Sheet Packing.	
Boston Woven Hose & Rubber Co., Cambridge, Mass.	252.00
Bowers Rubber Works, 68 Sacramento St., San Francisco, Cal.	243.00
George S. Carpenter & Co., 206 S. Water St., Chicago, Ill.	168.00
Continental Rubber Works, 43 Murray St., New York	489.00
Cuyler & Mohler, 611 William St., Baltimore, Md.	322.00
Garlock Packing Co., 186 Liberty St., New York	210.00 115.50

B. F. Goodrich Co., 66 Reade St., New York	273.00
Mechanical Rubber Co., Lisbon Rd., Cleveland, O.	282.00
Mineralized Rubber Co., 18 Cliff St., New York	315.00
National Electrical Supply Co., Washington, D. C.	238.00
Peerless Rubber Mfg. Co., 16 Warren St., New York	280.00
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.	189.00
Republic Rubber Co., 47 Warren St., New York	294.00
William G. Stevenson, 110 Race St., Philadelphia, Pa.	231.00
Trenton Rubber Mfg. Co., Box 6, Trenton, N. J.	476.00
Francis T. Witte Hardware Co., 106 Chambers St., New York	560.00
United & Globe Rubber Mfg. Co., Trenton, N. J.	210.00
Charles Bond Co., 520 Arch St., Philadelphia, Pa.	210.00
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa.	231.00
Fox Bros. & Co., 126 Lafayette St., New York	196.00
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York	266.00
E. F. Keating Co., 453 Water St., New York	180.00
Manning, Maxwell & Moore, 85 Liberty St., New York	231.00
Manhattan Supply Co., 127 Franklin St., New York	252.00 322.00

New Jersey Car Spring & Rubber Co., Jersey City, N. J.	196.00
Revere Rubber Co., 59 Reade St., New York	324.00
Vermilye & Power, 17 Battery Pl., New York	210.00
Class 31—800 Lbs. Flax or Hemp Packing.	
George S. Carpenter & Co., 206 S. Water St., Chicago, Ill.	200.00
A. W. Chesterton & Co., 64 India St., Boston, Mass.	224.00
Cuyler & Mohler, 611 William St., Baltimore, Md.	280.00

Garlock Packing Co., 186 Liberty St., New York	184.00 120.00
Handlau-Buck Mfg. Co., St. Louis, Mo.	240.00
H. W. Johns-Manville Co., 100 William St., New York	200.00
Mineralized Rubber Co., 18 Cliff St., New York	136.00
National Electrical Supply Co., Washington, D. C.	120.00
Peerless Rubber Mfg. Co., 16 Warren St., New York	240.00
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.	160.00
William G. Stevenson, 110 Race St., Philadelphia, Pa.	232.00
Francis T. Witte Hardware Co., 106 Chambers St., New York	176.00
United & Globe Rubber Mfg. Co., Trenton, N. J.	140.00
Clement Restein Co., 133 N. Second St., Philadelphia, Pa.	160.00
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa.	132.00
Fox Bros. & Co., 126 Lafayette St., New York	136.00
Manning, Maxwell & Moore, 85 Liberty St., New York	123.20
Manhattan Supply Co., 127 Franklin St., New York	147.20 200.00 120.00
Motley, Green & Co., 66 Broad St., New York	

Old Dominion Paper Co., Norfolk, Va.	151.20
Revere Rubber Co., 59 Reade St., New York	240.00
Class 34—50 Lbs. Sectional Tubular Packing.	
George S. Carpenter & Co., 206 S. Water St., Chicago, Ill.	340.00
A. W. Chesterton & Co., 64 India St., Boston, Mass.	325.00
Continental Rubber Works, 43 Murray St., New York	350.00
Cuyler & Mohler, 611 Williams St., Baltimore, Md.	400.00
Garlock Packing Co., 186 Liberty St., New York	270.00 180.00

Handlau-Buck Mfg. Co., St. Louis, Mo.	360.00
Jenkins Bros., 71 John St., New York	275.00
H. W. Johns-Manville Co., 100 William St., New York	250.00
Mechanical Rubber Co., Lisbon Rd., Cleveland, O.	325.00
Mineralized Rubber Co., 18 Cliff St., New York	247.50
National Electrical Supply Co., Washington, D. C.	185.00
Peerless Rubber Mfg. Co., 16 Warren St., New York	350.00
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.	300.00 210.00

Queen City Supply Co., Cincinnati, O.	325.00
William G. Stevenson, 110 Race St., Philadelphia, Pa.	195.00
Trenton Rubber Mfg. Co., Box 6, Trenton, N. J.	180.00
United & Globe Rubber Mfg. Co., Trenton, N. J.	200.00
F. S. Banks & Co., 73 Warren St., New York	225.00
Charles Bond Co., 520 Arch St., Philadelphia, Pa.	240.00
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa.	190.00
Fox Bros. & Co., 126 Lafayette St., New York	180.00
E. F. Keating Co., 453 Water St., New York	200.00
Manning, Maxwell & Moore, 85 Liberty St., New York	185.00
Motley, Green & Co., 66 Broad St., New York	295.00
New Jersey Car Spring & Rubber Co., Jersey City, N. J.	212.50
Class 35—320 Lbs. Asbestos Tape Packing.	
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National Electrical Supply Co., Washington, D. C.	156.80
New Jersey Asbestos Co., 52 Dey St., New York	208.00

Double Service Packing Co., 430 Walnut St., Philadelphia, Pa.	190.40
Fox Bros. & Co., 126 Lafayette St., New York	211.20
E. F. Keating Co., 453 Water St., New York	176.00
Manning, Maxwell & Moore, 85 Liberty St., New York	153.60
Manhattan Supply Co., 127 Franklin St., New York	169.60
Class 36—4,100 Lbs. Steam Square Packing.	
A. W. Chesterton & Co., 64 India St., Boston, Mass.	

Boston, Mass.	\$2,870.00
Garlock Packing Co., 186 Liberty St., New York	5,412.00
Mechanical Rubber Co., Lisbon Rd., Cleveland, O.	3,690.00
National Electrical Supply Co., Washington, D. C.	2,829.00
New Jersey Asbestos Co., 52 Dey St., New York	2,644.50
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.	2,665.00
William G. Stevenson, 110 Race St., Philadelphia, Pa.	2,929.00
United & Globe Rubber Mfg. Co., Trenton, N. J.	2,706.00
Charles Bond Co., 520 Arch St., Philadelphia, Pa.	2,952.00
Clement Restein Co., 133 North Second St., Philadelphia, Pa.	3,239.00
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa.	2,859.75
E. F. Keating Co., 453 Water St., New York	2,255.00
Manning, Maxwell & Moore, 85 Liberty St., New York	2,870.00
Manhattan Supply Co., 127 Franklin St., New York	3,050.40
Revere Rubber Co., 59 Reade St., New York	3,485.00

### BIDS FOR FURNISHING BUOY SINKERS.

Bids were received at the office of the inspector of the second lighthouse district, at Boston, Mass., opened Dec. 4, for buoy sinkers, were as follows:

*Granite Railway Co., West Quincy, Mass.	\$509.50
Walter S. Lyons, Boston, Mass.	547.00
Thomas Fitzgibbon, Beverly, Mass.	650.00
John T. Cavanagh, Quincy, Mass.	800.00

\*Accepted.

### BIDS FOR NAVAL SUPPLIES.

Bids received at the bureau of supplies and accounts, navy department, Washington, D. C., opened Dec. 10, for material and supplies, included the following:

Class 18—Brooklyn—4,050 Ft. Linen Hose and Three Hose Nozzles.	
Boston Belting Co., 256 Devonshire St., Boston, Mass.	\$ 732.00
Eureka Fire Hose Co., 14 Barclay St., New York	670.57
S. F. Hayward & Co., 20 Warren St., New York	647.10
William G. Stevenson, 110 Race St., Philadelphia, Pa.	596.62
Class 19—Norfolk—Gate Valves, Tees, Bolts, Flanges, Bends, Gaskets, Pipe, Etc.	
Crane Co., Baltimore, Md.	\$ 5,356.17
E. F. Keating Co., 452 Water St., New York	8,718.49
John P. Duffey, 1 Broadway, New York	8,373.42
Class 28—Brooklyn—30,000 Yds. Flax Canvas.	
DeGraw, Aymer & Co., 34 South St., New York	\$16,527.00
O'Jaffee & Pinkens, 103 Franklin St., New York	16,200.00
Class 29—Norfolk—9,000 Yds. Cotton Canvas.	
R. P. Clarke Co., Washington, D. C.	\$ 2,430.00
Old Dominion Paper Co., Norfolk, Va.	2,774.00
Thomas M. Turner, 86 Worth St., New York	2,820.00
Class 30—Norfolk—500 Yds. Bag Canvas.	
R. P. Clarke Co., Washington, D. C.	\$ 2,800.00
Joseph R. Michael, 280 Broadway, New York	2,950.00
Thomas M. Turner, 86 Worth St., New York	2,931.25
Class 31—Norfolk—16,000 Yds. Khaki Canvas.	
Otto Geotze, 111 Worth St., New York	\$ 6,302.50
John H. Meyer Co., 75 Worth St., New York	1,266.25
Thomas M. Turner, 86 Worth St., New York	6,200.00

### BIDS FOR LOCKS AND DAMS, TRINITY RIVER.

Bids for constructing locks and dams 2 and 4, Trinity river, Texas, received by Capt. W. P. Wooten, corps of engineers, U. S. army, Dallas, Tex., and opened Nov. 18 were as follows:

	Lock and Dam No. 2.	Lock and Dam No. 4.
D. C. McCord, Dallas, Tex.	\$135,825.00	
Ball-Carden Co., Dallas, Tex.	125,482.36	\$126,338.91
Midland Bridge Co., Kansas City, Mo.	232,841.62	236,448.12



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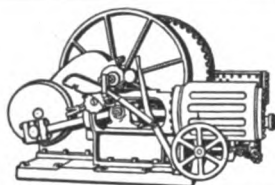
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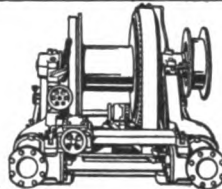
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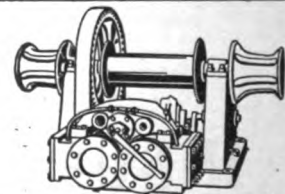
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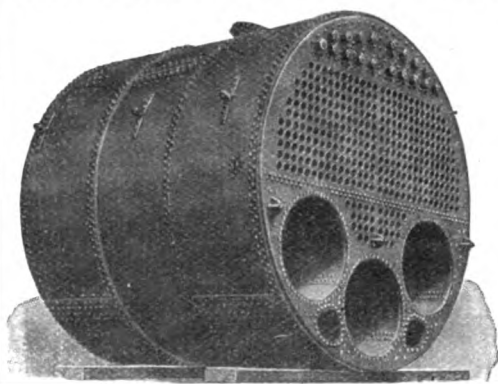
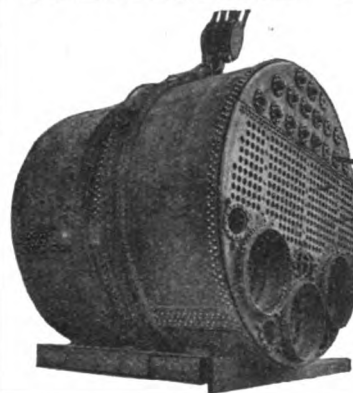


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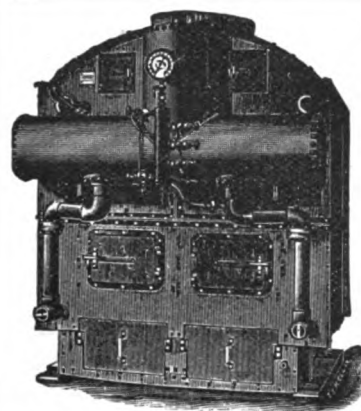
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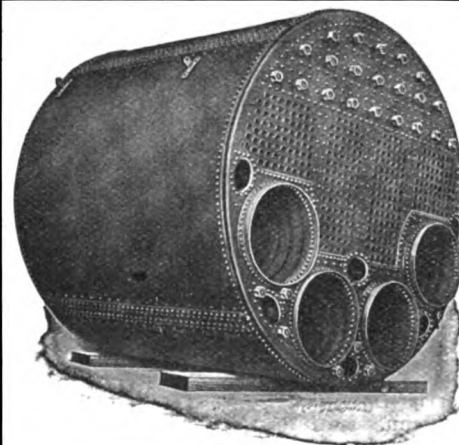
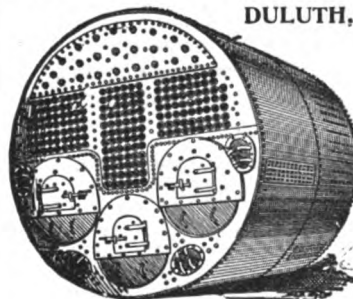
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U. S. Engineer Office, Detroit, Mich., December 16th, 1907. Sealed proposals for dredging Saginaw River, Mich., will be received at this office until 3 P. M. January 16, 1908, and then publicly opened. Information furnished on application. Chas. E. L. B. Davis, Col. Engineers.

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